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# ASSESSMENT OF PROPOSED NET WEIGHT LABELING REGULATIONS FOR MEAT AND POULTRY PRODUCTS

Charles R. Handy  
Benjamin Sexauer  
Linda Weingarten

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## ABSTRACT

Under a December 1977 net weight labeling proposal by USDA affecting meat and poultry products, free liquids and liquids absorbed by the packaging material would be excluded from a product's net weight. This study evaluates the potential economic impact on consumers, industry, and inspection officials. It concludes the proposed regulations have been grossly misunderstood by both consumers and producers. The amount of drained weight meat available for sale would not change under the proposed net weight rule. Although the labeled price per pound would likely increase, the cost to consumers for usable product would remain unchanged.

KEYWORDS: Net weight, labeling, drained weight, regulations.

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## SUMMARY

The Food Safety and Quality Service (FSQS), U.S. Department of Agriculture (USDA), proposed new net weight labeling regulations for meat and poultry products on December 2, 1977, in response to a petition from the State of California (cosigned by 47 other States) and to complaints by many consumers. The FSQS proposal contains the following new regulations:

- \* Free liquids as well as juices, fats, and solids absorbed by the packaging material would be excluded from a product's net weight. Thus, net weight would equal drained weight.
- \* The allowance for moisture loss due to evaporation would be eliminated. The average weight for products from the same lot would be required to equal or exceed the labeled net weight; however, single packages would be permitted actual weights below the labeled weight by a specified amount.
- \* Federal net weight standards would be established for bulk shipments or wholesale-sized packages.
- \* An FSQS-approved net weight quality control program would be required at most federally inspected meat and poultry plants.

There is widespread disagreement concerning the need for the proposal and its economic impact. USDA's Economics, Statistics, and Cooperatives Service (ESCS) was asked to assess the need for the proposal and its potential economic impact.

This ESCS study concludes that the proposal would achieve the two objectives defined by FSQS: (1) consumers could be assured that the weight of usable meat and poultry is equal to its labeled weight, and (2) States would be able to enforce strict net weight standards at retail. However, the study also concludes that the latter objective could probably be accomplished as effectively under a system that allows free liquid as part of the product's net weight.

The effects of the proposed rule change have been misunderstood by both consumers and producers. Consumers cannot expect the reported price per pound of a product to remain unchanged if free liquids are excluded from labeled product weights. The price per pound can be expected to increase--and to increase most for those products with relatively more free liquid. However, the cost to consumers for usable product would remain unchanged. Actual costs to producers would not increase because of the change in the definition of tare (that is, those parts of a product whose weight is not included in the labeled net weight). The amount of drained weight meat would not be affected by a labeling rule, and processing costs per drained weight pound would be unaffected.

The main benefit of a drained weight system would be to increase the accuracy of information available in the marketplace for all meat and poultry products. Consumers would be better able to make per pound price comparisons.

Producers would not be competitively disadvantaged by those who use techniques resulting in a higher proportion of free liquid to usable product (immersion chilled v. air chilled). The buyers of bulk packed products would have a clearer standard for checking weights of shipments received. Such a standard would be helpful mainly to small-volume buyers.

The quality-control requirement of the proposed rule would increase industry cost \$59 to \$116 million, mostly because additional personnel would be hired. Assuming all quality-control costs are passed on to consumers, the increase in price per pound would be less than one-half of 1 cent.

The major additional costs to State and local governments would be about \$421,000 in new equipment to enforce the drained weight inspection procedures. In addition, the number of inspectors might need to be increased. The proposed net weight checking procedures are considerably more time consuming than the dry tare standard. Most State and local officials surveyed said they believed that these additional costs would have to be absorbed by current budgets; about 10 percent felt their States might appropriate new funds for net weight inspection.

Some retailers may also incur additional costs resulting from the drained weight sampling procedures. In some areas, retailers may bear the expense of rewrapping products that have been opened and weighed, or they may have to absorb the cost of products that either cannot be repackaged or are not purchased by the government inspectors.

#### ACKNOWLEDGMENTS

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# ASSESSMENT OF PROPOSED NET WEIGHT LABELING REGULATIONS FOR MEAT AND POULTRY PRODUCTS

*Charles R. Handy, Benjamin Sexauer, Linda Weingarten\**

## INTRODUCTION

On December 2, 1977, the Food Safety and Quality Service (FSQS), U.S. Department of Agriculture (USDA), proposed new net weight regulations for meat and poultry products. The proposal would exclude any free or absorbed liquid by the packaging material from a product's net weight. There was widespread disagreement concerning the need for the proposal and its economic impact. FSQS subsequently asked the Economics, Statistics, and Cooperatives Service (ESCS) to review the available evidence and assess the need for the proposal and its potential economic impact on consumers, producers, and State and local government inspection officials.

Our study was designed to meet the following objectives: (1) to evaluate the need for the proposal and to determine to what extent data obtained in this study support the FSQS decision that a change was needed and (2) to determine the economic impact of the proposal, if adopted. The objectives of the proposed regulations served as a basis for this study.

## Background

The Wholesome Meat Act of 1967 and the Wholesome Poultry Act of 1968 authorized USDA to promulgate regulations for the net weight of federally inspected meat and poultry products after leaving an official establishment. These regulations are administered by FSQS. Existing net weight regulations under the Federal Meat Inspection Act as amended (21 U.S.C. 601 et seq.) and the Poultry Products Inspection Act as amended (21 U.S.C. 451 et seq.) required that:

The labeled weight shall not be false or misleading and shall express an accurate statement of the quantity of the contents of the container exclusive of wrapper and packing substances. Reasonable variations caused by loss or gain of moisture during the cause of good distribution practices or by unavoidable deviations in good manufacturing practice will be recognized. Variations from stated quantity of contents shall not be unreasonably large.

Individual State and local weights and measures officials also have authority to determine and enforce net weight compliance at warehouses and retail stores in their jurisdictions. Some States and localities have more stringent net weight standards than the Federal regulations in that they do not allow for reasonable variations caused by moisture loss during distribution. In 1973, a U.S. District Court in California ruled (*The Rath Packing Company v. M. H. Becker, et. al.*) that California was precluded by section 408 of the Federal Meat Inspection Act from imposing on

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\*Charles R. Handy is an agricultural economist with the National Economics Division, and Linda Weingarten is an economic assistant with the International Economics Division. Benjamin Sexauer is an associate professor of agricultural economics with the University of Minnesota.



federally inspected products net weight requirements that are "in addition to, or different than" the Federal regulations. The court also held that Federal regulation 9 CFR 317.2 (h) (2) was void due to its vagueness as the term "reasonable variation" had not been defined.

USDA published a proposed regulation in 1973 outlining procedures to determine reasonable variations. A final rule was never issued. During public hearings on the proposal in 1974, consumers generally expressed two concerns. First, they objected to including in the net weight any free liquid that might drain from the product after packaging and before sale. Second, they objected to regulations that permitted the actual net weight of any package to fall below the labeled net weight.

In 1975, the U.S. Court of Appeals reversed the district court's decision that the Federal net weight regulation was void due to vagueness but upheld its ruling that the Federal regulations preempt State and local standards. The district court's ruling on preemption was affirmed by the U.S. Supreme Court in March 1977.

Following that affirmation, California filed a petition, cosigned by 47 other States, requesting that USDA change its net weight regulations. State officials would be unable, they argued, to give practical enforcement to the Federal regulations which allow an undefined reasonable allowance for moisture loss. They claimed Federal regulations would be unenforceable outside the official plant as State inspectors would be unable to judge whether deviations from the labeled net weight were due to reasonable moisture loss or a result of short weighting.

In response to the California petition and to consumer complaints, FSQS proposed new net weight labeling regulations for meat and poultry products in the Federal Register on December 2, 1977 (vol. 42, No. 232).

#### Objectives of Proposal

A review of the proposed net weight regulations and the hearing record showed that the main objective of the proposed changes had nowhere been explicitly stated. In an April 2, 1979 memorandum to USDA's Economics, Statistics, and Cooperatives Service (ESCS), FSQS stated the two main objectives to be achieved by the proposal.

The first (objective) is to insure that the weight of the usable meat and poultry purchased by consumers is at least equal to the weight stated on the package. This apparently is not the case under the present regulation. We now require that net weight statements be accurate only at the time they leave the plant, and it is possible for moisture loss to occur between the time the product leaves the plant and the time it is purchased by consumers. In addition, our present regulation counts free liquid as part of the net weight. As a result of moisture loss and free liquid, consumers have frequently complained that they have no way of knowing how much usable product they are getting for their money.

Our second objective is to enable States to enforce strict net weight standards at retail. They presently cannot do so because the Supreme Court has held that the Federal Meat Inspection Act prevents States from issuing regulations in addition to or different than the Federal standard. We believe we can correct this situation by replacing the present Federal standard based on "reasonable variation" with a standard requiring that the average weight of meat or poultry products from a single lot be at least equal to the weights stated on the package.

## Proposed Changes in Regulations

Specific elements of the regulation, as proposed, would eliminate the existing exemption for one product--bacon--and would make the following changes:

- o Change the definition of tare.<sup>1/</sup> For frozen products the tare weight would include the container and any adhering ice crystals. For nonfrozen products where the entire contents are to be consumed, tare would remain the weight of the dry container. For nonfrozen products where the entire contents are not to be used, it would be the packaging material, including adhering or absorbed juices, fats, or solids and free juices within the container or packaging. Tare weight would be determined by subtracting the weight of the drained product from the gross weight. To determine the drained weight the package must be opened. The product would be placed on a certain size mesh screen and allowed to drain for 2 minutes. Then the product and screen would be weighed and the weight of the dry screen subtracted.
- o Change allowable variation. Currently, reasonable variations from labeled net weight are allowed due to loss or gain of moisture (evaporation) during good distribution practices. The proposal would eliminate allowances for moisture lost from the package due to evaporation, called "shrinkage" in the industry. The vagueness of the term "reasonable allowance" has hampered some States' net weight enforcement efforts. In addition, the proposed rule would establish new maximum allowable variations (MAV) for single packages that were below the labeled net weight due to unavoidable imperfections during good manufacturing practices. Homogeneous products that are fluid when filled would be allowed less variation than would products not so easily packaged.
- o Control industry quality. A net weight quality control program, approved and monitored by USDA, would be required for establishments under Federal regulation where products bearing net weight labels are packaged for sale to final consumers. Currently, USDA inspectors at the plant check weigh lots each week for net weight compliance. The proposal would shift part of the inspection burden from USDA to the industry.
- o Change the averaging procedure. The proposal would tighten the method for determining net weight compliance of packages selected for the inspection sample. Under the current system, one package with "unreasonably large deviations" from the labeled weight may be excluded from the sample. The sample is in compliance if the average actual net weight equals or exceeds the labeled net weight. The proposed regulation would not allow the inspector to eliminate any package from the sample regardless of the deviation between the actual and labeled net weight.
- o Affect bulk shipments. The proposal would require accurate net weight labels on immediate containers of bulk shipments of wholesale-sized packages after the product is shipped from the plant.

On a lot-average basis, the drained weight of the product at retail for fresh meat and poultry must meet or exceed the labeled net weight on the package.

These changes are controversial for the following reasons: (a) they require opening retail meat and poultry packages; (b) the labeled weight must be met on a

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<sup>1/</sup> Tare is the term used to refer to those parts of a product whose weight is not included in the labeled net weight. Dry tare is the weight of the dry packaging material before the product is packaged. Wiped dry tare is the weight of the used packaging material that has been opened and wiped clean so that it approximates the weight of the unused material. Wet tare includes used packaging material plus any liquid absorbed by the material. Drained weight tare includes the used packaging material plus all absorbed as well as free liquid.

drained weight basis throughout distribution including the retail level; and (c) many meat and poultry products lose considerable moisture due to evaporation and drainage during distribution.<sup>2/</sup>

### Study Objectives

After the proposal appeared in the Federal Register, over 3,000 public comments were received by the June 2, 1978, deadline. These comments indicated widespread disagreement concerning both the need for the proposed regulation and its economic impact. A draft impact statement on the proposal was prepared by FSQS in January 1978 but was not published. FSQS awarded a contract to the Consumer Federation of America (CFA) to provide additional analysis of the proposal's economic costs and benefits for consumers.<sup>3/</sup>

Following submission of the CFA study in October 1978, the comment period was reopened to December 1978. In addition, the House Committee on Agriculture requested that the General Accounting Office (GAO) evaluate the proposal and consider the feasibility of alternative systems. The December 1978 GAO report recommended that USDA conduct additional analysis on the best way to monitor net weight labeling activities.<sup>4/</sup> In December 1978, ESCS reviewed the available evidence concerning potential impacts of the proposed regulations and concluded that additional data and analysis were needed prior to making final decisions.

As a result of these reviews, ESCS was asked to evaluate the accumulated evidence and reassess the economic costs and benefits of the proposal.

### Methodology

In addition to reviewing all testimony, written comments, and data submitted to the USDA net weight hearing record, ESCS collected original data to help answer questions concerning: (1) current net weight inspection practices and enforcement problems, (2) the current position of State officials concerning the proposed regulations, (3) the impact of the proposal on State inspection procedures, (4) evidence of economic adulteration and value comparison problems, and (5) the extent processors currently use different tare weights for identical packages depending on local net weight regulations.

### Field Tests to Determine Amount and Variability of Drained Liquid

ESCS collected data on the amount of free and absorbed liquid in packages of whole cut-up chicken to help answer questions of consumer value comparisons, differences in drain across processing technologies, and variability in tares set at time of packing.<sup>5/</sup> Local weights and measures officials assisted ESCS by collecting data during routine inspection rounds. The drained weight procedure as outlined in

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<sup>2/</sup> Here moisture loss is defined as loss from the product (including free and absorbed liquid), not from the package, which would include only evaporation. Moisture loss will, therefore, be defined as loss from the product, not just from the package, except where otherwise noted.

<sup>3/</sup> Consumer Federation of America, "Analysis of Proposed Regulations on Net Weight Labeling," October 1978.

<sup>4/</sup> General Accounting Office, "Proposed Changes in Meat and Poultry Net Weight Labeling Regulations Based on Insufficient Data," CED-79-28, December 20, 1978.

<sup>5/</sup> The 10 field test locations were: Maryland, Maine, Boston (Mass.), Bucks County (Pa.), Buffalo (N.Y.), Michigan, Chicago (Ill.), Los Angeles (Calif.), Riverside (Calif.), and Washington (State).



the proposed regulations was strictly followed. Precise instructions and standardized data collection forms were sent to each locality to insure the comparability of the data (see appendix C). The procedure was field tested by ESCS and a Maryland inspection official.

The number of usable observations in the completed sample included 297 packages of deep-chilled prepackaged chicken packed by 7 different processors, 232 packages of in-store packaged chicken from 8 different retailers, and 40 packages of dry-chilled prepackaged chicken from the only processor currently using this processing method. The deep-chilled chicken was immersion chilled and then shipped in a deep-chilled or crust frozen state at about 28° F. All in-store pack was immersion chilled and in most cases shipped in an ice-packed bulk container. The dry-chilled chicken was not immersion chilled but was cooled by chilled air.

### Survey of Weights and Measures Officials

Current practices of State and local weights and measures offices regarding net weight inspection were obtained from chiefs of each State's office and from chiefs of a few large cities known to have independent jurisdiction, such as New York City and Philadelphia (see appendix A for sample questionnaire). Information was also obtained as to how practices would change if the proposed regulations were promulgated. Of the 66 questionnaires mailed, 45 responses were received--a 68-percent response rate. Of the States, 41 (82 percent) responded.

### Discussions with Retailers

ESCS contacted food retailers in different regions of the country to determine current store practices in handling meat and poultry packages, net weight inspection procedures and disposition of products not in compliance, and handling practices for bulk shipments of poultry. The sample included 10 small retailers in Virginia, Pennsylvania, Washington, and Oregon; 4 large regional supermarket chains; 5 national or multi-regional chains; and 1 wholesale distributor. Names of small retailers were provided by the Pennsylvania Food Merchants Association and the Virginia Food Dealers Association, Inc. The sample questionnaire used to guide the discussion is reproduced in appendix D.

### Conversations and Interviews with Weights and Measures Officials

Telephone conversations and personal interviews were conducted with officials of State and local offices of weights and measures. Some occurred during the Northeast Regional Conference of Weights and Measures in Hartford, Conn.

In addition, a member of the ESCS study team visited Sacramento to discuss the proposed regulations with officials from the California Department of Food and Agriculture and officials from the Division of Measurement Standards. The chief of the Oregon Weights and Measures Division also was present.

In addition, ESCS acquired the following information:

- o FSQS provided additional specifications concerning requirements for the proposed net weight quality control (QC) program. These include detailed time estimates for each QC function and the number and size distribution of the plants affected.
- o Carole Brickenkamp, National Bureau of Standards, provided technical advice on the actual procedures of net weight inspection and sampling methodology.
- o The Food and Drug Administration (FDA) held discussions with the ESCS study on similarities and differences between the USDA net weight proposal and a draft FDA net weight proposal.

- o The Consumer Federation of America gave ESCS access to all its files used in connection with its net weight study for USDA.
- o The ESCS study team utilized data on moisture loss submitted to the hearing record by the American Meat Institute and the North Carolina Department of Agriculture, Consumer Standard Division.

#### NEED FOR PROPOSED REGULATIONS

Arguments supporting the need for change center around three general issues: (1) enforcement--providing a uniform verifiable standard; (2) economic benefit--protecting consumers from paying meat and poultry prices for added moisture; and (3) quality of net weight information--improving accuracy of present net weight information and insuring consumers' legal right to receive the full labeled weight at time of purchase.

The enforcement issue deals primarily with the proposed elimination of any allowance for moisture loss (evaporation) from the package. The economic and information issues relate primarily to the proposed change to drained weight labeling.

#### More Enforceable Standard

The problem of enforcing the Federal net weight regulations was the key issue raised by State weights and measures officials. This issue is independent from whether a dry tare or a drained weight approach would be used. The problem of enforceability at the retail level has been the allowance for reasonable variation from labeled net weight due to moisture evaporation from the package (shrinkage) during good distribution practices. As the reasonable allowance has not been specified, local inspectors cannot determine the compliance of packages from federally inspected plants without making arbitrary decisions which could be challenged in court.

The ESCS survey of the chiefs of State and local weights and measures departments asked the official position of each State concerning the overall net weight proposal and its five major parts (appendix A, question 13). Caution is urged on those who interpret the responses to question 13, as on about one-fifth of the 45 returned questionnaires, the question was not answered. Question 13b asked respondents to give their State's official position concerning the part of the proposal eliminating any allowance for moisture gain or loss. This part of the proposal received the most favorable response from the weights and measures chiefs. Twenty-five (56 percent) of the 45 respondents said their States were in favor of no allowance for moisture loss. Thirteen respondents did not answer the question. Including only those 32 chiefs who did answer, 69 percent favored removing the moisture allowance. Six chiefs (19 percent) said their States were not in favor, and four checked no opinion.

When asked what effect the Rath decision has on their ability to enforce State net weight regulations, 12 of 45 respondents (27 percent) said no effect, 38 percent said little effect, 20 percent checked great effect, and 16 percent said they were no longer checking federally inspected prepackaged meat and poultry. However, several State officials told us that the Rath decision had little effect on their net weight inspection program as they were continuing to inspect prepackaged product even though their local standards did not make allowances for shrinkage. These officials claimed that the Rath decision could have a much larger impact on their inspection program if federally inspected processors decided to challenge their inspection procedures in court.

Under the present net weight inspection system, there is no evidence of a chronic shortweight problem. Evidence submitted to the USDA hearing clerk indicated a high level of net weight compliance for meat and poultry products in both dry tare and wet tare States. Washington State reported a 96-percent compliance rate from April 1976 to March 1977; New Mexico's compliance rate from July 1977 to January 1978 was 96 percent for fresh poultry and 99 percent for red meat and processed meat; Oregon reported a 95-percent compliance in 1977; and California reported 98 percent of the meat, poultry, and fish items in 1976 were in compliance. California weights and measures officials told ESCS that recent tests have shown no decline in the high levels of compliance for meat and poultry. This indicates that packers of prepackaged meat and poultry products voluntarily maintained a tare weight sufficient to pass a wet tare standard.

However, weights and measures officials from California and other wet tare jurisdictions expressed strong concern that if the proposed USDA regulations were not adopted, processors would begin to reduce the tare weight of packages that are subject to large moisture loss without a corresponding reduction in the price per pound. These officials argued consumers in their State would thereby be subject to "hidden inflation." Only those products with significant drainage would be affected. Also, the "hidden inflation" problem would be reduced to the extent competitive pressures were sufficient to force reductions in the labeled price per pound in correspondence with any reduction in the tare weight.

According to contacts with food retailers and responses from the State questionnaire, a high percentage of meat and poultry bulk shipments are short weight when received by wholesalers, retailers, and food service establishments.

All 18 retailers contacted said they have had problems with short weight bulk shipments. Of the weights and measures officials responding to the State questionnaire, 5 indicated compliance at less than 24 percent for bulk shipments in their jurisdiction, 7 said 25-49 percent, 7 said 50-74 percent, 15 said 75-94 percent, 3 said over 95 percent, and 8 had no response. Of the 37 responding to the question, 19 indicated a compliance rate of less than 75 percent. For these commercial transactions, according to the retailers contacted, it is common industry practice for the buyer to check weigh a sample from each shipment using a drained weight procedure (for ice packed poultry). The overwhelming procedure for handling short weight shipments was to adjust the invoice. Thus, for those buyers who routinely check weigh, paying for delivered drained weight is the accepted industry practice.

Two problems were frequently mentioned in relying solely on the buyer to check for net weight compliance. First, many buyers either do not take the time or do not have the facilities to conduct routine spot checks of bulk shipments for net weight compliance. Therefore, a substantial number of short weight bulk packages go undetected. These buyers pay a higher price per drained weight pound. Second, many small buyers indicated they have little leverage with their suppliers and often lack alternative sources of supply. These buyers are not able or do not try to adjust invoices for short weight shipments. Therefore, including bulk shipments in the proposed regulations would benefit primarily those retailers and food service buyers who do not routinely check for net weight compliance.

#### Accurate Label Information

Considerable debate has taken place as to what extent the proposed rule would increase the accuracy of the labeled net weight and price per pound information.

## Need for Drained Weight Labeling

The industry's immediate response to drained weight labeling would be to increase the amount of "overpack" for fixed weight products, such as bacon. For random weight products, the industry would increase the tare subtracted from the gross weight of the package, thus reducing the labeled net weight without changing the quantity of meat or poultry in the package. The increase in tare would have to be sufficient to account not only for the average moisture loss but also for the distribution or variability of moisture loss around the average to achieve a high level of net weight compliance. These changes would alter the information available to consumers. Arguments for the need of drained weight labeling information fall in two categories--one, truth in packaging; the other, economic benefits.

Truth in packaging.--Under current Federal regulations, consumers have no assurance that the usable meat or poultry in a package will at least equal the labeled net weight as any free or absorbed liquid in the package can be counted as part of the net weight. By eliminating any allowance for evaporation and including any moisture drained into the package as part of the tare weight, the proposed regulations would assure consumers of receiving usable product that is at least the labeled net weight (within a narrow tolerance allowed for weighing errors). Moving to a drained weight system is the only alternative consistent with providing this assurance and achieving the first objective of the proposed regulation.

However, the relationship between the average moisture loss and the variability about that average is crucial to the effect drained weight labeling can have on improving the accuracy of the labeled net weight and price per pound. Drained weight labeling cannot guarantee that all consumers receive precisely the same weight of usable meat or poultry for the same price. Because of the large variability of moisture loss in some products, even with drained weight labeling, two consumers each buying a package of chicken breasts labeled 2 pounds will likely receive different amounts of usable product. Some will pay more and some slightly less for the same amount of meat or poultry. The only way to reduce this problem is to reduce the variability of the moisture loss.

Economic issues.--The labeled price per pound is important for value comparisons among various meat and poultry products. Improving the consumer's ability to make more accurate value comparisons of usable product may help. Specifically, consumers would be able to increase the value of a given level of income, facing a given set of prices. Drained weight labeling would cause shifts in the relative labeled price per pound of various meat and poultry products, even though no change occurs in the real price per drained weight pound. The price per pound information supplied to consumers could shift dramatically for products such as fresh liver and chicken breasts that suffer a large and variable moisture loss. For consumers who use the labeled price per pound to influence their purchase decisions, the shift to drained weight labeling could produce shifts in their purchasing patterns.

It is incorrect to infer that consumers are currently paying meat and poultry prices for drained liquid. Changing the definition of tare weight does not change the quantity of drained weight meat or poultry products available for sale. Although the labeled price per pound will likely increase, drained weight labeling will not affect the real price per pound of usable product. Thus, the definition of tare has little impact on whether consumers, on the average, are being overcharged for meat and poultry products, assuming the absence of widespread abuse or economic adulteration under a dry tare system.

Evidence from State questionnaire.--In contrast to their strong support of eliminating allowance for moisture loss from evaporation, State weights and measures officials generally were not in favor of moving to a drained weight system for

determining net weight compliance. Of the respondents, 51 percent said their State was not in favor of the drained weight portion of the net weight proposal; 29 percent favored the shift to drained weight; 2 percent indicated no opinion; while 18 percent did not answer this question. Many State officials felt the dry tare or combination dry tare/wet tare procedures they now use provide adequate net weight protection to consumers.

#### Issues of Excess Variability in Drained Liquid Among Processors

The potential benefits to consumers of drained weight labeling increase to the extent that, for a particular product, large variability in the amount of drained liquid exists across processors. Such large variability also raises the possibility of economic adulteration. An ESCS field test, using 10 local weights and measures agencies, collected data on the amount and variability of drained liquid in packages of whole cut-up chicken across processors and retailers (table 1). Packages from six different prepack processors were tested in seven localities. All were deep-chill brands which have an average moisture pickup of 5-6 percent at time of packaging.

Table 1--Amount and variability of drained liquid  
in whole cut-up chicken

Processors or retailers	Total location	Packages	Average drain as percentage of labeled net	Range	
				Minimum	Maximum
		Number	Percent		
Prepack (deep-chill):					
A	Maryland	40	3.69 (0.92)*	1.53	6.31
A	Los Angeles, Calif.	10	4.62 (1.58)	2.83	8.29
B	Los Angeles, Calif.	10	3.12 (1.12)	1.02	5.51
B	Michigan	50	2.32 ( .83)	.27	4.38
C	Buffalo, N.Y.	40	4.58 ( .68)	3.11	6.06
C	Chicago, Ill.	40	3.63 (1.22)	.38	6.93
D	Los Angeles, Calif.	38	3.03 (1.66)	.88	8.49
D	Riverside, Calif.	29	3.55 (1.53)	.71	8.20
E	Washington (State)	30	2.96 ( .98)	0	4.72
F	Washington (State)	10	3.90 ( .62)	3.31	5.36
Prepack (air-chilled):					
G	Massachusetts	40	1.52 ( .62)	.52	3.39
In-store (pack):					
H	Los Angeles, Calif.	38	2.13 (1.05)	.16	4.64
I	Michigan	20	1.48 ( .46)	.63	2.34
J	Michigan	10	2.30 ( .64)	1.38	3.24
K	Michigan	10	.98 ( .40)	.53	1.68
L	Riverside, Calif.	36	2.87 (1.19)	.58	6.50
M	Bucks County, Pa.	38	1.34 (1.12)	0	4.03
N	Chicago, Ill.	40	.99 ( .47)	0	2.03
O	Chicago, Ill.	40	.83 ( .71)	0	3.09

\* Standard deviation appears in parentheses.

For example, 40 packages from processor A were tested in supermarkets in Maryland. The amount of drained liquid as a percentage of the labeled net weight was determined for each package, and then an average for the sample was computed--in this case, 3.69 percent. The standard deviation of the sample mean was 0.92; the drain as percentage of labeled net weight across the 40 packages ranged from 1.53 percent to 6.31 percent. For prepack product, the average drain varied from 2.32 percent for processor B to 4.62 percent for processor A. There was also considerable variability of drainage within processors as well as between processors. Processor A's packages tested in Los Angeles averaged 4.62 percent drainage, whereas the packages tested in Maryland had an average drain of 3.69 percent. Processor B's packages had the lowest average drain but, as with processor A, those packages shipped a longer distance to Los Angeles had a higher drainage. For processor C, the distance to Buffalo and Chicago is roughly the same. However, Chicago uses a drained weight procedure to test net weight, whereas Buffalo uses a dry tare procedure. It is possible that the lower average drainage for the packages tested in Chicago compared with those in Buffalo partly reflects the incentive provided by drained weight standards to reduce drainage.

For in-store packaged chicken, packages from eight retailers (H through O) were tested in five localities. For example, 39 packages of whole cut-up chicken from retailer H were tested in four Los Angeles supermarkets. The average drained liquid was 2.13 percent with a standard deviation of 1.05. The percentage drain ranged from 0.16 percent to 4.64 percent. Of these localities, only Bucks County uses a dry tare. The average drain of the in-store packed chicken is consistently low across all eight retailers. Only retailer L had as much drainage as the lowest prepack sample.

Table 2 summarizes similar information by type of pack. The average moisture drainage of deep-chilled prepackaged chicken as a percentage of the labeled weight was 3.4 percent. The percentage drainage for the in-store packaged product was 1.6 percent, and for the dry-chilled, 1.5 percent. The difference in drainage for the prepack deep-chilled category was statistically significant from that of the other two categories based on a t-test at the 0.05 significance level. The moisture drainage for the in-store packed chicken was lower than the deep-chilled pack primarily because the time interval between packaging and retail inspection was shorter. The drainage was lower for the dry-chilled product because the product does not come in contact with water during chilling.

Considerably more variability occurred in the average drainage between types of pack than between different processors of prepack product. Table 3 combines the packages of each processor regardless of test location, so that variability in average drainage across processors can be compared. The average drain for each of the six processors clustered closely around the overall average of 3.42 percent. Processor C had the largest average drain liquid at 4.11 percent. Processor C's average drain was statistically different at the 0.01 level from the overall group average drain, but the absolute difference between the two means was less than 1 percent (0.69 percent). Processor B performed considerably better than the group with an average drain of only 2.46 percent. If one considers the wide variability in drained liquid among packages of a single processor, the differences in drained liquid across processors are modest. Nonetheless, the data indicate considerable opportunity exists for reducing the average drain in chill-pack chicken.

The data show little evidence of widespread economic adulteration, a situation where the packages of some processors consistently contain much more drained liquid than the industry norm. The proposed regulations, by eliminating drained liquid in the package from the net weight, reduce the incentive for economic adulteration.



Table 2--Amount and variability of drained liquid in whole cut-up chicken, by type of pack

Type of pack	Packages	Average drain as percentage of labeled net weight	Range	
			Minimum	Maximum
	<u>Number</u>	<u>Percent</u>		
Deep-chill prepack	297	3.43 (1.33)*	0	8.49
Air-chilled prepack	40	1.52 ( .62)	.52	3.39
In-store pack	232	1.59 (1.13)	0	6.50

\* Standard deviation appears in parentheses.

Table 3--Amount and variability of drained liquid, by processor

Processor	Packages	Average drain as percentage of labeled net weight
	<u>Number</u>	<u>Percent</u>
C	80	4.11* (1.09)**
F	10	3.90 ( .16)
A	50	3.87* (1.13)
D	67	3.26 (1.61)
E	30	2.96* ( .97)
B	60	2.46* ( .92)
Group average	297	3.42 (1.33)

\*Differs from the group average at the 0.01 level of significance.

\*\*Standard deviation appears in parentheses.

## Problems in Defining Usable Product

The drained weight approach would be applied to those nonfrozen products where the entire contents of the package are not to be consumed. The term usable or consumable product does not represent a precise, easily defended concept, however. Defining usable product presents both practical difficulties and conceptual problems.

For example, should the juice that drains from red meat before retail sale be treated as usable product? A number of grocery managers said a distinction should be made between drained liquids that are natural juices and drained liquids composed largely of water absorbed during processing. They argued that for the former the drained liquid should be considered part of the usable product, because it can be poured back over the top of the product before cooking.

Corned beef, cured in a brine solution, absorbs considerable brine during processing. California, which currently has a drained-weight-at-retail approach for some products, includes the liquid in the corned beef package as usable product. The assumption is that people cook the corned beef in this liquid. If the liquid were disallowed as usable product, corned beef would have a large drainage problem. Corned beef processors would have to substantially "underlabel" to comply with a drained weight regulation.

Theoretically, drained weight labeling would not fully define usable or consumable product. Most consumers now routinely discard as unusable varying amounts of fat and bones from meat and poultry products. This situation becomes more complex since considerable variation may exist between household practices. Some households may use the ham bone to make soup; others may simply discard it. Some consumers pour the juices in a steak package back over the top of the meat before cooking; others do not.

For products such as poultry, ham, and corned beef which absorb water during processing, the limitations of drained weight labeling must be stressed. Most poultry, for example, is immersion chilled in a water or a water and ice slurry. Poultry that will be sold fresh is legally allowed to pick up an average of 12 percent water during processing. The standard is 10 percent for frozen poultry.

For poultry, the subsequent drain is primarily a function of the water absorbed during processing. When poultry is actually packed some of the water has already drained out, so the absorbed moisture at that point is about 6 percent for whole cut-up chicken. Some opportunity exists for the unscrupulous operator to increase profits by allowing as little drain as possible before packing and shipping, thus enhancing yield. However, as mentioned, we found little evidence indicating that such abuse is common.

From the consumer's perspective, there is no reason to distinguish between the absorbed water drained into the package before time of purchase and the absorbed water retained within the product itself. Most of the latter will simply escape from the product after purchase. Drained weight labeling would deal only with the moisture lost before retail sales.

## POTENTIAL IMPACT OF PROPOSED REGULATIONS

This section deals first with the issues surrounding the cost of overpack. How does the variability of moisture loss affect the amount of overpack (or increase in tare) required to insure compliance? What is the effect of the additional overpack on the labeled price per pound and on the real price per drained weight pound? Moving away from a static analysis, how might industry and consumers respond to drained weight labeling information? Next, the specific industry, consumer, and government impacts are evaluated.

## Cost of Overpack

The variability of moisture loss has a direct impact on the amount of overpack or tare weight required to comply with the proposed regulations. But there appears to be considerable misunderstanding concerning the cost of overpack to producers and consumers.

### Variability of Moisture Loss

Moisture loss before retail sale for any given cut of meat or poultry will vary. Moisture loss depends on such factors as the specific biological characteristics of the product and its handling, especially temperature and elapsed time. Moisture loss is defined here as both shrinkage and drainage, but for meat and poultry is primarily the latter.

As shown in figure 1, the mean moisture loss for 30 packages of a large national processor's prepackaged chicken breasts was 3.9 percent. However, the moisture loss ranged from 1.9 to 5.6 percent.<sup>6/</sup> Moisture loss is measured as a percentage of the original net weight of the product as packed at the processor's plant. From data on the original net weight, the weight loss to shrinkage and drainage could be calculated separately. However, for chicken breasts, the moisture loss was entirely due to drainage. The shrink was zero, which is not surprising for a product distributed in a deep chilled state (28 °F).

In figure 1 the percentage moisture losses have been rounded to the nearest half a percent, making the low value 2.0 and the high value 5.5. After rounding, 2 packages of the 30 had a moisture loss of 2.0 percent, 2 were at 2.5 percent, 6 at 3.0, 5 at 3.5, 4 at 4.0, 3 at 4.5, 3 at 5.0, and 5 at 5.5.

The industry's most likely immediate response to drained weight labeling for meat and poultry would be, in their words, to "overpack." More precisely, they would "underlabel" for random weight packages, such as chicken, and "overfill" for products, such as bacon, which have a fixed weight printed on the package.

Most importantly, the tare weight--the difference between the actual gross weight on the scale and the labeled weight on the retail package--could not allow for the average moisture loss only. If the packing tare allowed for only a 3.9-percent moisture loss for chicken breasts, roughly 50 percent of the packages would fail a drained weight test at retail. This assumes, with a very large number of chicken breast packages, a normal distribution would be approximated. If the sample data in figure 1 were used, with an allowance for a 3.9-percent moisture loss, 14 packages out of the 30 would be rejected. Insuring that all these packages would comply with the drained weight requirement at retail would require allowing for the possibility that the maximum moisture loss could occur.

The distribution of moisture loss for a particular sample of a specific product can be assumed to approximate a student's t-distribution. That is, as the sample size is increased, the distribution would approach the familiar bell-shaped curve of a normal distribution. Figure 2 represents the student's t-distribution for the data in figure 1. The distribution is centered on the mean of 3.9 percent; the variance about this mean is 1.3 percent, and the standard deviation 1.1 percent.

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<sup>6/</sup> This data set is used for illustrative purpose only and is not necessarily representative of all brands of chicken breasts; however, the argument holds regardless of the "actual" mean moisture loss. The data were collected March 31, 1978, by North Carolina Department of Agriculture, Consumer Standards Division, and made available to USDA.

Figure 1

## Frequency Distribution of Weight Loss for Prepackaged Chicken Breasts

Number of packages

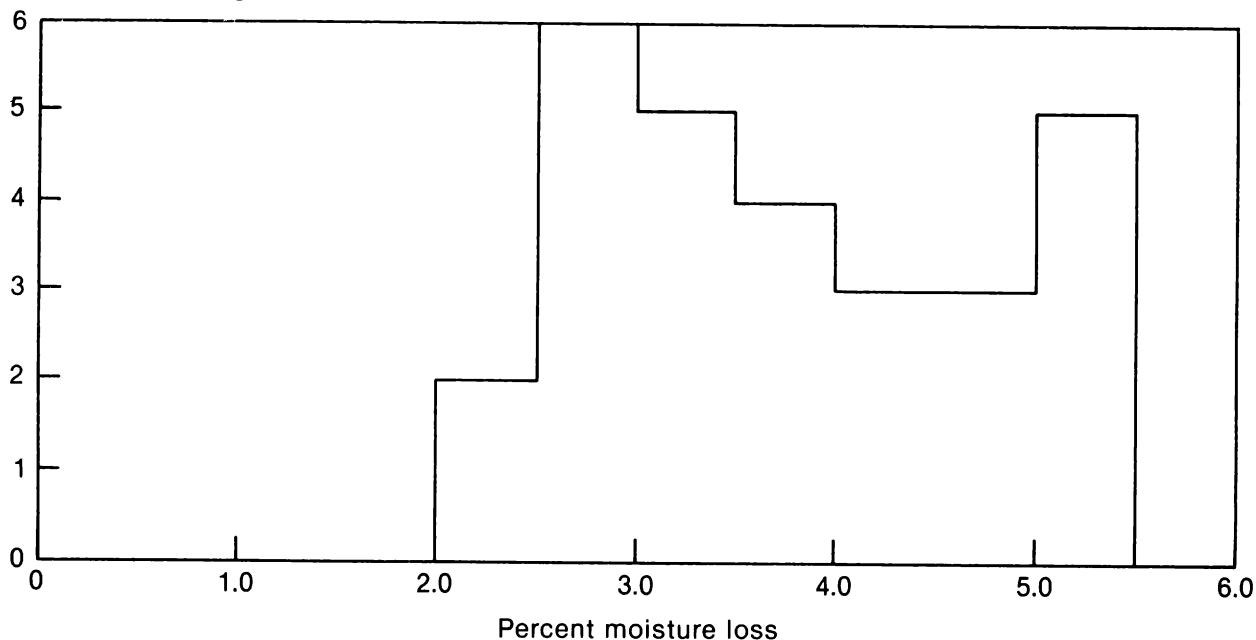
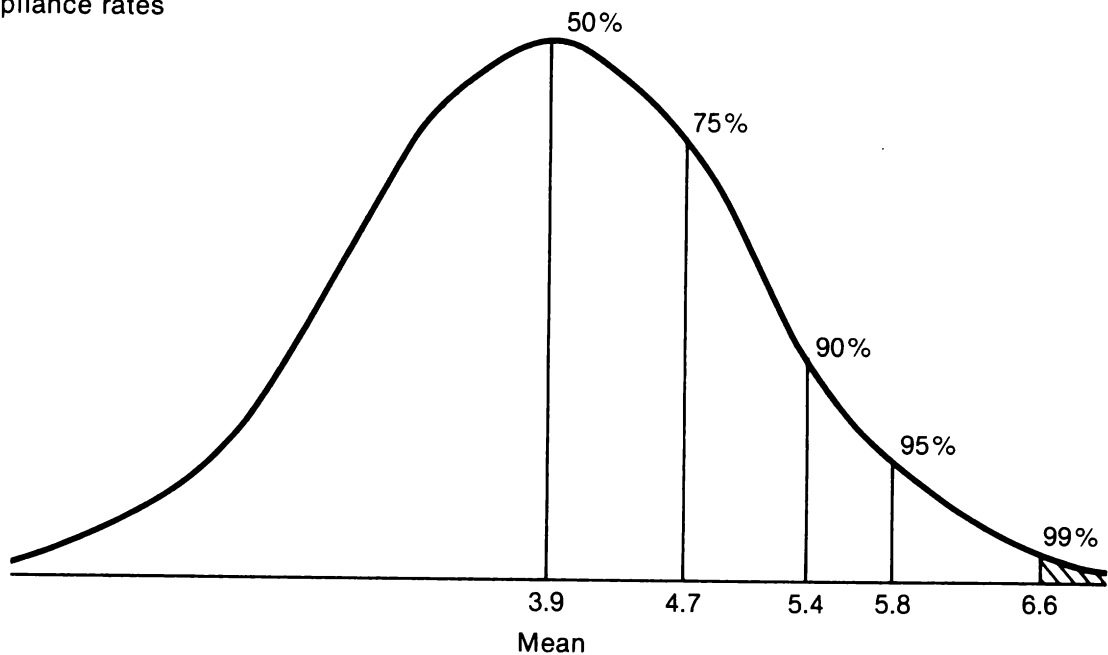


Figure 2

## Allowance for Certain Percentage Compliance Rates

Compliance rates



Assumes a student's t-distribution. Percent moisture loss.

Using the tables for the distribution of  $t$ , one can calculate the necessary moisture loss allowance for any desired level of compliance with a regulation on drained weight labeling at retail. For a sample size of 30, only 1 percent of the area under the curve lies beyond 2.457 standard deviations above the mean and only 5 percent beyond 1.697 standard deviations above the mean.<sup>7/</sup> Insuring a 99-percent compliance rate would, therefore, require allowing for a moisture loss of 2.457 standard deviations above the mean, or 6.6 percent. A 95-percent compliance rate would require allowing for a loss of 1.697 standard deviations above the mean, or 5.8 percent. Likewise, a compliance rate of 75 percent and a rejection rate of 25 percent would be achieved by allowing for 4.7-percent moisture loss.

#### Cost to Consumers and Producers

Producer groups argue that the cost to consumers of additional overpacking will be substantial. The American Meat Institute contends that the additional cost will be more than \$380 million for only a limited number of meat products studied.<sup>8/</sup> The National Broiler Council places the cost of "overpack" for the broiler industry at \$177.5 million.<sup>9/</sup> They estimate the retail price of broilers would increase by at least 3.2 cents per pound. The National Turkey Federation places the additional cost at \$88 million for their products.<sup>10/</sup> This increased cost will be passed on to consumers, add to inflation, and cut industry sales and revenue, they argue.

All these estimates seem to be vastly overstated. They are computed by multiplying the increase in the labeled price per pound for each product by the total quantity sold in retail-sized packages. For random weight products, any increase in the labeled price per pound would be offset by a reduction in the labeled net weight so that the cost of the package to consumers remains the same. For packages with a fixed labeled weight, such as 1-pound packages of luncheon meat or bacon, most packers will slightly increase the amount of product in the package. As the labeled weight remains 1 pound, the labeled price per pound will increase to compensate for the additional quantity of meat in the package. However, the real price per drained weight pound (labeled price per pound divided by actual weight of meat in the package) will not change because of the increase in overpack.

In addition to making the above error, the industry did not adjust its estimates of increased costs for the quantity of each product already sold in wet tare or drained weight jurisdictions. These products already have a sufficiently large tare weight so they would require little or no additional overpacking to comply with the proposed regulations. Supporting evidence is given in table 4.

Thus, a second major point is that the economic cost to producers and consumers from additional overpacking (or "underlabeling"), in and of itself, approaches zero. The following examples illustrate this point.

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<sup>7/</sup> In practice, processors would use a much larger sample size than 30 to determine required moisture allowance.

<sup>8/</sup> Written entry to the public hearing records on the proposed regulations in a letter to the USDA Hearing Clerk dated June 1, 1978, from A. Dewey Bond, Vice-President of the American Meat Institute.

<sup>9/</sup> Written entry to the public hearing records in a letter to the USDA Hearing Clerk dated June 2, 1978, from National Broiler Council.

<sup>10/</sup> Written entry to the public hearing records in a letter to the USDA Hearing Clerk dated June 2, 1978, from G. L. Walts, Executive Vice President, National Turkey Federation.

Table 4--Variability in tares between processors and shipping points for prepack whole cut-up chicken<sup>1/</sup>

Processor	Test location	Average tare	Average tare as percentage of gross weight
		<u>Pound</u>	<u>Percent</u>
Using wet tare or drained weight:			
A	Los Angeles, Calif.	0.19	5.90
B	Los Angeles, Calif.	.13	4.18
B	Michigan	.16	5.21
C	Chicago, Ill.	.19	6.20
D	Los Angeles, Calif.	.17	5.68
D	Riverside, Calif.	.16	5.31
E	Washington (State)	.20	5.49
F	Washington (State)	.18	5.47
Using dry tare:			
A	Maryland	.12	3.61
C	Buffalo, N.Y.	.10	3.27
A	North Carolina	.18	3.65

<sup>1/</sup>Tare is the term used to refer to those parts of a product whose weight is not included in the labeled net weight.

Fixed weight package: Bacon.<sup>11/</sup>--Under current dry tare regulations, a 1-pound package of bacon hermetically sealed on an absorbent board is currently overfilled an average of 0.02 lb., yielding 1.02 lb. at time of packing. This product sells for \$1.78 per pound. The average moisture loss of 2.5 percent reduces the drained weight at time of sale to 0.99 lb.; therefore, the real price pound of drained weight bacon is \$1.79 ( $\$1.78 \div 0.99 \text{ lb.}$ ).

Drained weight labeling would require the overfill to increase another 0.03 lb. (to insure a 99-percent compliance), giving an average package weight of 1.05 lb. at time of packing. The labeled price per pound would likely increase 5 cents, from \$1.78 to \$1.83 to compensate for the additional product. Assuming the same average moisture loss of 2.5 percent, the drained weight at time of sale is reduced to 1.02 lb. Thus, the real price per pound of drained weight bacon is the same as before--\$1.79 ( $\$1.83 \div 1.02 \text{ lb.}$ ). There is no change in the real price per drained weight pound or real cost to the consumer whether or not a dry tare or drained weight method is used.

<sup>11/</sup> Data for this example are drawn from the American Meat Institute (AMI) Industry Net Weight Shrink Tests submitted to the USDA Hearing Clerk, dated June 1, 1978. The AMI study provides data on current overpack, average weight loss, additional overpack to comply with proposal, and retail price.



Random weight package: Chicken.--Under dry tare regulations, a package of chicken breasts selling for \$1.20 per pound with a labeled weight of 3.0 lb. costs the consumer \$3.60. Assuming the package suffers the average moisture loss of 4 percent, the consumer actually receives 2.88 lb. of drained weight chicken.<sup>12/</sup> The real price per pound of drained chicken is \$1.25 ( $\$3.60 \div 2.88 \text{ lb.}$ ).

With drained weight regulations, the processor will increase the tare enough to allow for a 6-percent moisture loss (2 percent above the average to assure compliance). The labeled net weight would be 2.82 lb. To compensate, the labeled price will be increased from \$1.20/lb. to \$1.28/lb. The cost of the package will remain \$3.60 (2.82 lbs. x \$1.28/lb.). Assuming the package suffers the average 4-percent moisture loss as above, the drained weight will be 2.88 lb. Just as before, the real price per pound of drained weight chicken is \$1.25 ( $\$3.60 \div 2.88 \text{ lb.}$ ).

In summary, drained weight labeling regulations can alter the information a consumer receives, but not the real cost of the product.

Whether consumers pay chicken prices for water is not clear simply because a dry tare labeling weight is allowed. If \$3.60 is the competitive cost for a 3-lb. package of chicken breasts, then the consumer is not paying \$1.20/lb. for 0.12 lb. of water and juices. The consumer is simply not being informed that the true price of chicken at the retail level on a drained weight basis is \$1.25/lb., not \$1.20.

Consumers may well be paying more for chicken or other meat and poultry products than can be justified. But to verify such an assertion would require an extensive study of the industrial organization of the industry and data on firm costs, revenues, and profits. Answering that question is beyond the scope of this study.

### Reactions to Regulation

The possible response to a drained weight labeling regulation both by industry and consumers is examined here. The industry may be induced to adopt methods which would reduce the average and the variability of moisture loss, particularly the drainage portion. The response of consumers to an increase in the labeled price per pound would vary depending upon their understanding of net weight labeling practices.

Potential response by industry.--The beneficial impact of drained weight labeling is enhanced if, as a result, the moisture loss of meat and particularly poultry products is reduced. Drained weight labeling could be expected to stimulate such a response from the industry. Firms able to reduce average moisture loss and/or its variability may achieve a competitive advantage, depending on costs involved.

For example, let us suppose one firm has to make a moisture loss allowance of 10 percent for its product and another firm's product suffers no moisture loss. The first packs 3.00 pounds of chicken breasts (including water picked up during processing) but sells it as 2.70 pounds for \$3.60, or \$1.33 per labeled pound. The second could pack only 2.70 pounds and, if costs allowed, could offer to sell it at a price under \$1.33/lb. They could either keep the price up and make a large profit per unit sold or reduce the price per labeled pound and increase volume.

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<sup>12/</sup> This example oversimplifies by assuming that the current tare set at packing is exactly equal to weight of the dry packaging material. However, stores and processors currently leave a sufficient margin between the labeled and packaged weight of a product to insure a high level of compliance under a dry tare check at retail. In other words, a package labeled 3.0 lb. will likely have a gross weight of 3.15 lb. and a dry tare net weight of 3.05 lb. Some "overpack" already takes place. The packaging material weighs 0.10 lb., but a tare of 0.15 lb. was set on the scale at packaging to allow for deviations in the scale and other factors such as moisture loss to evaporation.

The industry's reactions depend on the degree to which moisture loss is controllable--a disputed point. The industry claims that moisture loss is largely unpredictable for any given package. Consumer groups claim that it is controllable. Moisture loss does appear to be controllable in two ways. First, for poultry where the greatest moisture loss problem occurs, certain processing and packing technologies result in less moisture loss. Second, time between packaging and retail sale is a key factor in moisture loss. By reducing the elapsed time, moisture loss can be reduced.

As previously shown (table 2), the average moisture drainage as a percentage of the labeled weight was significantly higher for deep-chilled prepackaged chicken than for in-store packaged chicken or for air-chilled chicken which does not pick up water during chilling.

The National Broiler Council estimated the share of shipments of broilers held by each type of pack as: 50 percent ice-pack, 30 percent deep-chilled prepackaged, 10 percent CO<sub>2</sub> "snow ice," 8 percent frozen, and 2 percent controlled atmosphere.<sup>13/</sup> The prepackaged share of the market increased from 24 percent in 1974 to 30 percent in 1978. Some of these types may be placed at a competitive advantage by shifting to a drained weight at retail regulation. However, we should make clear that the dry tare approach, currently used in most States, also gives certain processing and shipment modes, such as ice-pack, an advantage.

Drained weight labeling could reduce the number of bulk poultry shipments packed in ice. Ice-pack adds water to poultry, which could increase drainage after retail packaging. Under the proposal, bulk shipments would also be subject to net weight inspection. Compliance by ice-pack shipments could require relatively large "under-labeling."

The industry is experimenting with hermetically sealed vacuum-packed containers for both bulk and retail-sized packages. Store packing might offer an advantage as the elapsed time between retail packaging and consumer purchase can be reduced to a minimum thereby reducing drainage. Prepack poultry operations may decide not to place a net weight on individual consumer packages at the plant. Retailers would then be responsible for weighing and attaching net weight labels before displaying the product for final sale.

A drained weight labeling requirement would likely stimulate the adoption of processing technologies for poultry that minimize the pickup of water and, thus, the subsequent drainage. Currently, only one major U.S. poultry processor uses air chill instead of the normal water and ice chilling techniques. When a chilled air blast is used to cool the carcasses, a brief water spray wash is the products' only contact with water. However, air chilling does use more energy and costs about 4 cents per pound more than immersion chilling.<sup>14/</sup>

The meat and poultry industry would also be encouraged to ship and sell more frozen products, which would eliminate or greatly reduce drainage. A large portion of turkey products are already sold frozen.

A second method by which poultry would drain less water would be that of using a brine slurry for chilling. Raising the salt level would increase the tissues' moisture retention. However, this approach would add more sodium to the final product and could have negative health implications. In addition, consumers would receive no economic benefit from procedures which merely retain moisture picked up during processing.

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<sup>13/</sup> Broiler Industry, August 1978, p. 22.

<sup>14/</sup> Comment by W. J. Mendelson, President of Hillcrest Farms, Broiler Industry, February 1978, p. 36.

Potential response by consumers.--Our analysis has thus far shown that the industry's initial response to drained weight labeling would likely be to increase the labeled price per pound for many meat and poultry products. The magnitude of this increase would depend on the amount and variability of moisture loss, the current level of overpacking, and the competitive situation. Tables 5 and 6 show estimates of the magnitude of the shifts in the labeled price per pound for meat and poultry products.

One could argue that consumer expenditures for products with a large moisture loss would fall and consumers would buy less because of the upward shift in the labeled price per pound. However, this approach is naive. Expenditures for products with a small moisture loss could increase because of the unchanging or small increase in their labeled price per pound. Realistically, predicting the actual changes in purchase pattern is a complicated procedure. First, because purchasers may or may not correctly perceive the change, product demand will be altered accordingly. Second, suppliers may have negative expectations about consumer reactions to the proposal and make adjustments that would affect market conditions.

We offer several possible responses to the proposed change in net weight labeling. The first is the "no change" situation and is based on all participants being aware of and correctly interpreting the change. Other cases result in adjusting the market to consumer and industry responses.

#### "No Change" Situation

Under current regulations, a food product may contain varying quantities of liquid which, for transaction purposes, are considered part of the product. The liquid, either water or some other substance, may be added during some processing stage for various reasons; and it may not have sufficient time to drain before the product is packaged, weighed, and shipped.

Whether or not the liquid may be considered part of the product weight has considerable effect on the transformation ratio between the quantity of raw food commodity and the quantity of product processed and sold. If the liquid is allowed as part of the product weight, the value of the ratio is higher.

A food processor subject to the proposed changes in net weight labeling would anticipate or soon realize that the reported weight of product processed and sold, along with total revenue based on the old price, would be reduced. As the quantity of "real," or drained weight product processed would not change, the quantities of raw commodities and other resources along with the processor's total costs would not be affected. But average and marginal cost, currently based on the quantity of drained weight product produced, would be higher and would result in smaller profits.

Processors could resolve the perceived total revenue and profit problem by increasing the unit price sufficiently to offset the revenue loss from reported weight differences in product processed. This would not affect the value or the price per unit of "real" product produced. If consumers correctly perceive this adjustment in the reported price, market equilibrium conditions would not be affected regarding drained weight product marketed.

Table 5--Interproduct comparisons of moisture loss and values

Product	Mean drainage as percentage of labeled weight	99-percent compliance moisture allowance	Current labeled price/lb.	Average drained weight price/lb.	Labeled price/lb. under drained weight system
	-----Percent-----			-----Dollars-----	
1. Beef roast	0.45 (0.40)*	1.41	1.60	1.60	1.62
2. Pork chops	.38 ( .48)	1.50	1.85	1.86	1.88
3. Bologna	.31 ( .35)	1.17	1.09	1.10	1.11
4. Ground chuck	.32 ( .41)	1.30	1.54	1.54	1.56
5. Stew beef	.84 ( .79)	2.73	1.69	1.71	1.74
6. Beef liver	7.23 (4.10)	17.08	.97	1.11	1.23
7. Fresh pork shoulder	.53 ( .37)	1.43	1.03	1.06	1.07
8. Sliced bacon	.00 ( .00)	0.00	1.39	1.40	1.39
9. Whole chicken	1.82 ( .81)	3.81	.75	.75	.77
10. Breast halves	3.88 (1.69)	8.04	1.39	1.39	1.45
11. Drumsticks	.65 ( .38)	1.57	1.19	1.18	1.19
12. Family pack chicken breasts	3.95 (1.10)	6.67	1.29	1.31	1.35
13. Beef salami	.09 ( .29)	.90	.79	.79	.79
14. Sliced ham	.62 ( .53)	2.20	1.56	1.58	1.61

\*Standard deviation appears in parentheses.

Table 6--Increases in labeled price per pound due to additional overpack, 1978

Product <sup>1/</sup>	:	Additional	:	Price per	:	Increase in
	:	overpack	:	pound	:	price per
	:	required	:		:	pound
	:	<u>Percent</u>		<u>Dollars</u>		<u>Cents</u>
Frankfurters (16 oz.)	:	1.3		1.34		1.7
Luncheon meats (7 oz.)	:	3.2		2.30		3.2
Bacon (16 oz.):	:					
Nonabsorbent board	:	1.4		1.78		2.4
Absorbent board	:	2.5		1.78		2.4
Corned beef (55-oz. average)	:	3.0		1.89		19.5
Hams (dry cured)	:	.8		1.97		5.6

<sup>1/</sup> All products are hermetically sealed.

Source: American Meat Institute (AMI) written submission to the USDA hearing Clerk, June 1, 1978. Increase in price per pound computed from data contained in exhibit B of the AMI submission. Price per pound data collected during March and May 1978.

Figure 3 illustrates the no change conditions for the industry and for consumers subject to the net weight labeling proposal. Under current regulations,  $Q_0^P$  of a product (including drained liquid) is sold for  $P_0^P$  (panel A). The quantity  $Q_0^P$  is produced from  $Q_0^F$  of raw commodity in accordance with the transformation function  $T_0$  (panel B). At the farm level,  $Q_0^F$  is sold at a price of  $P_0^F$  (panel C).

Adopting the net weight labeling proposal shifts the transformation function to  $T_1$ , reflecting the elimination of free and absorbed liquid from the labeled net weight. As a result, the quantity  $Q_0^F$  currently yields  $Q_0^P$  of marketplace (drained weight) product. However, the quantity of "real" product is the same in  $Q_0^P$  and  $Q_1^P$ .

Under the new equilibrium conditions, the quantity  $Q_1^P$  is sold for  $P_1^P$  and the industry's total revenue is the same as before, that is:

$$P_1^P \cdot Q_1^P = P_0^P \cdot Q_0^P$$

Consumer expenditures are the same, and the quantity of drained weight product consumed is also the same.

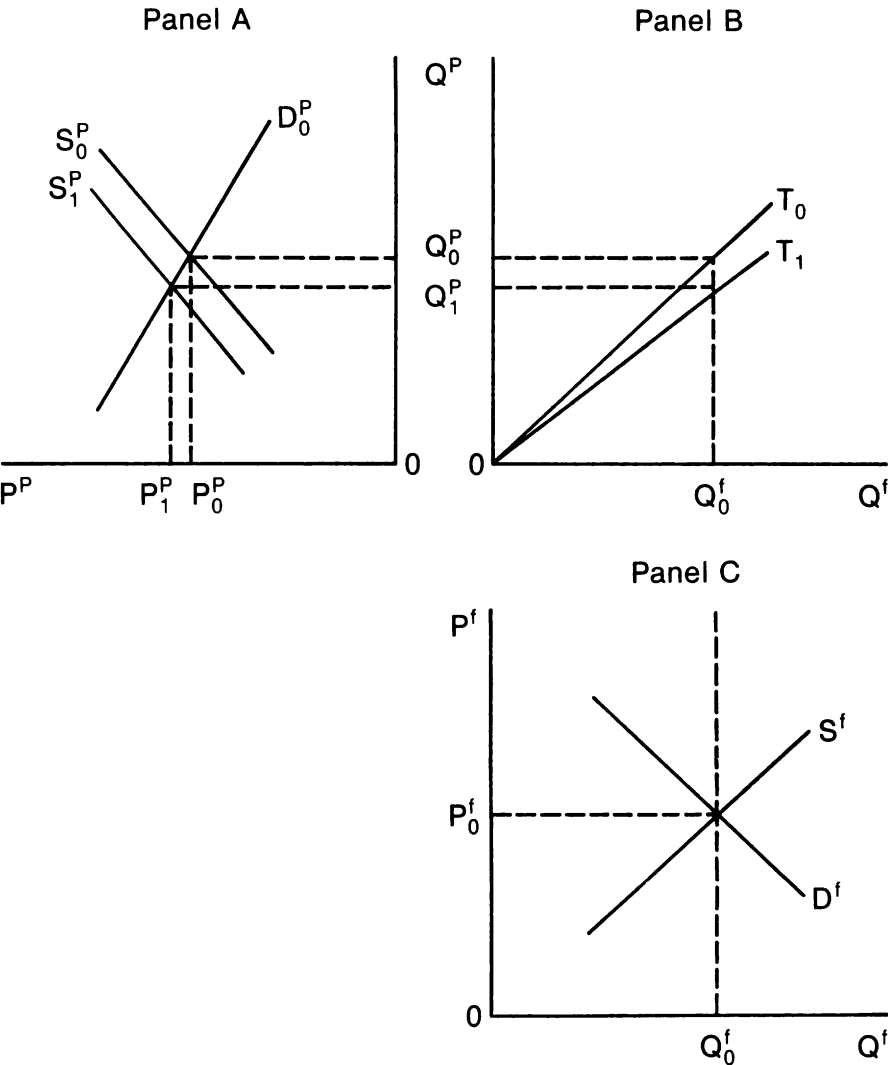
With equilibrium conditions maintained in the "real" product market, market conditions at the farm level remain unchanged.

#### Situation of Consumer Unawareness

Although publicity would accompany any program to implement a change in net weight labeling, not all consumers would necessarily be aware of, or even understand, the change in reported prices or product weights. Consequently, consumers could interpret a price increase compensating for the exclusion of the free liquid as an

Figure 3

**Optimum Premarket and Postmarket  
Equilibrium Conditions for a  
Net Weight Labeling Change**





increase in the per unit price of "real" product. This reaction would cause those meat products less affected by the drained weight rule to appear relatively less expensive. Consumers would substitute more of those products for what they perceived as higher priced products.

This reaction by a significant number of consumers could alter the market for these products. Figure 4 illustrates the price and quantity adjustments for a product affected by the new regulations. Instead of purchasing  $Q_1^P$  at the price of  $P_1^P$ , consumers purchase a smaller quantity of the product,  $Q_2^P$ , at a lower price,  $P_2^P$ . As consumers purchase a smaller quantity of the "real" product, a proportionally smaller quantity of the raw commodity,  $Q_2^F$ , is needed. Consequently, adjustments at the farm level result in a reduction in output to  $Q_2^F$ , which is sold at a lower price,  $P_2^F$ . Total producer revenue is reduced.

The situation in substitute markets (those less affected by the new regulations) is just the opposite. Prices and the volume produced and sold are higher.

### Increased Consumer Education

Firms could increase expenditures for consumer education in response to a reduction in product sales caused by consumer misperceptions of the drained-weight label rule. Their purpose would be to regain the lost sales by correcting inaccurate perceptions.

Figure 5 illustrates the effects of such a firm- or industry-sponsored program on markets for the product affected by the new regulations. Instead of the "no change" situation of  $Q_1^P$  in sales at price  $P_1^P$ , sales fall initially to  $Q_2^P$  and price is  $P_2^P$ . The price and the quantity sold in the raw commodity market also initially fall, to  $P_2^F$  and  $Q_2^F$ , respectively.

A consumer education program increases unit production costs, thus shifting the supply function from  $S_2^P$  to  $S_3^P$ . Some consumers with misconceptions about the drained weight label change would return to their former product purchase patterns. This situation would cause demand for the drained weight product to shift from  $D_2^P$  to  $D_3^P$ . Both the volume sold,  $Q_3^P$ , and the price,  $P_3^P$ , are higher but not necessarily as high as the "real" product quantity weight,  $Q_1^P$ , and the price,  $P_1^P$ , were originally.

The raw commodity market response is an increase in quantity sold to  $Q_3^F$  and a higher price,  $P_3^F$ . Producer revenue also increases. But, in the case shown, neither the quantity, price, nor revenue is restored to the original level.

Presumably, a successful education program would ultimately be terminated, thus eliminating the cost. At that point, sales, price, and revenue would be close or equal to their former "real" levels.

Results would be similar whether or not the food processor or farm commodity producers financed the education program. Government sponsorship would benefit the industry more as costs would be spread over the total economy.

### Other Situations

Other types of reactions could occur. For example, the change might favorably alter consumer perceptions about the product and actually increase demand. This would raise prices and trigger expansion in output by the processing industry and producers. Producers and processors of substitutes would, however, be negatively affected.

Figure 4

# Impact of Consumer Unawareness of a Weight Label Change on Product and Commodity Markets

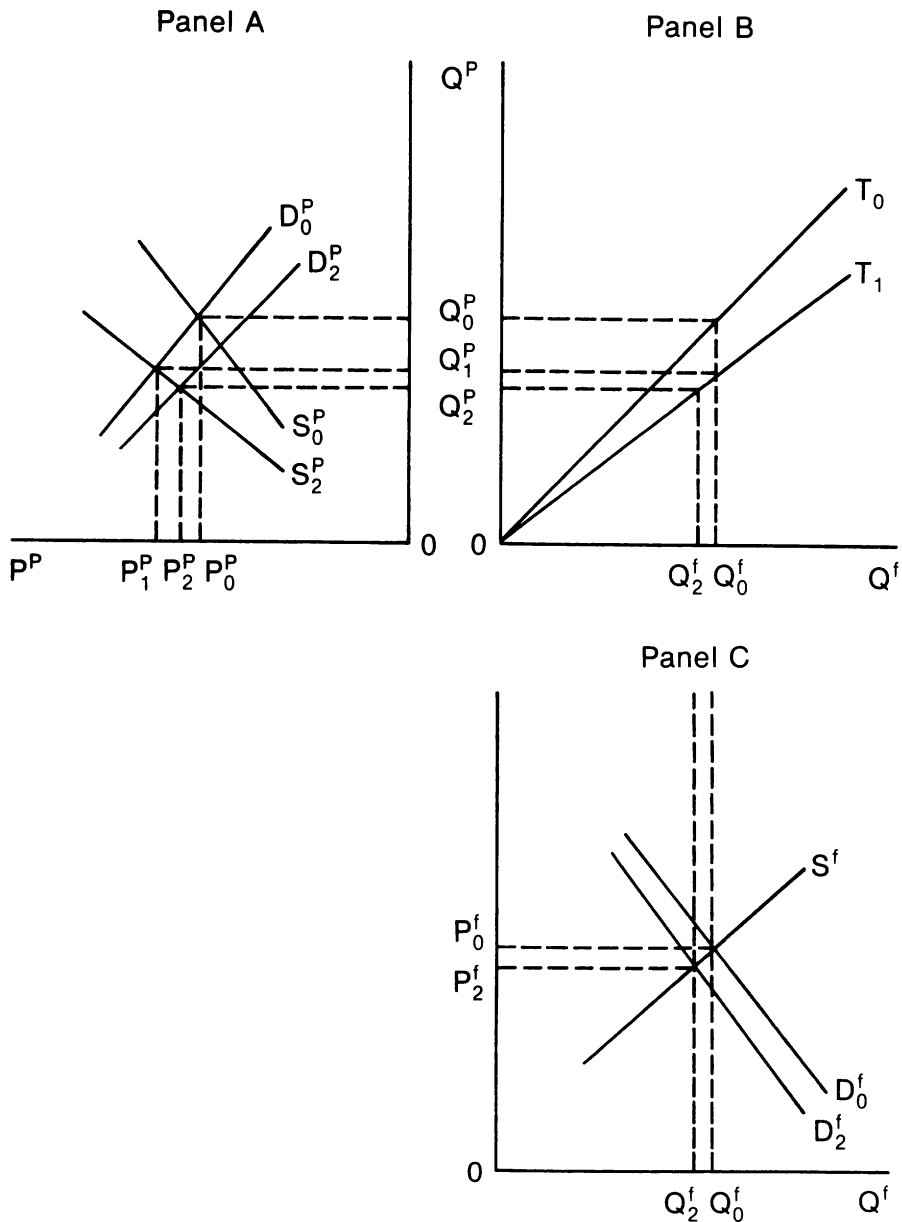
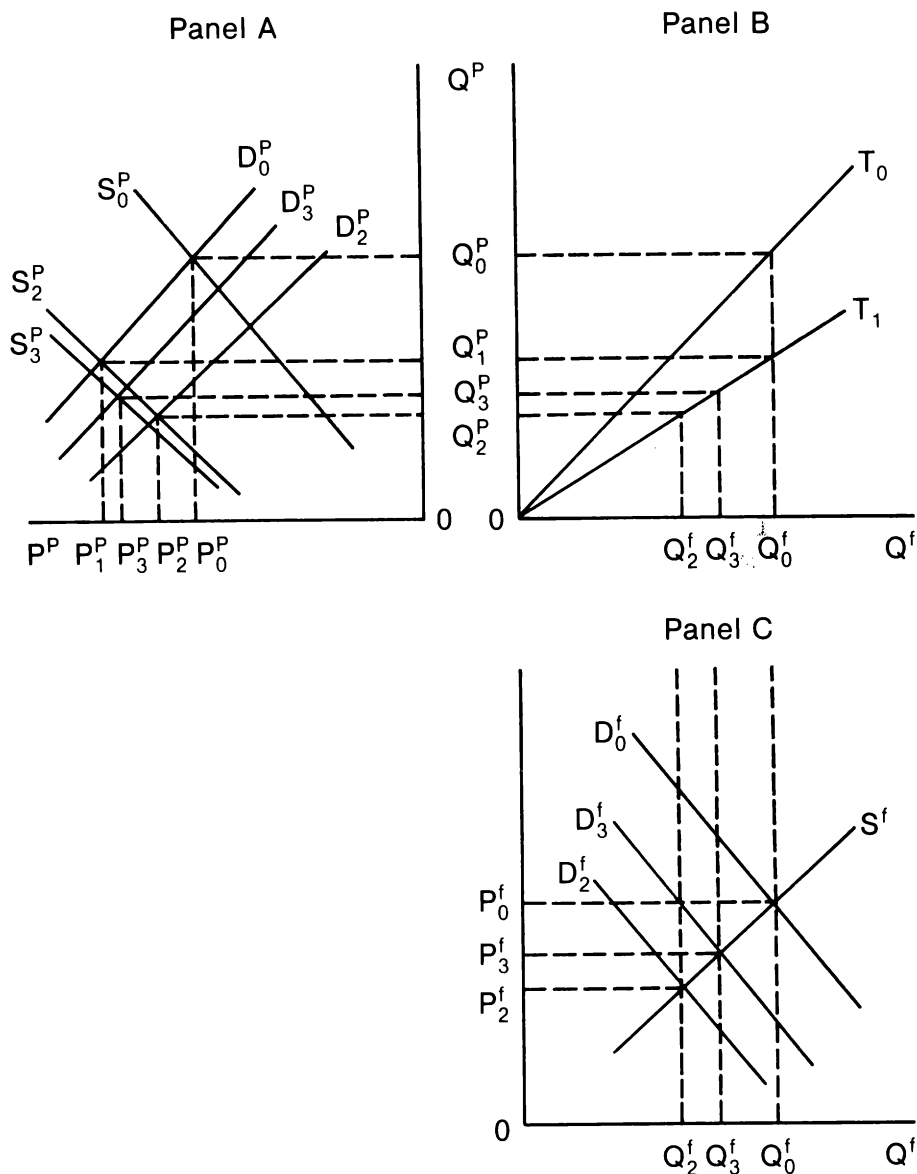


Figure 5

# Impact of Industry Consumer Education Program on Product and Commodity Markets



The voluntary exit of some firms could also occur. This response could be the result either of firms regarding the change as unwarranted or of their perceived inability to comply. This could temporarily reduce the supply of "real" product, raise prices, and decrease raw commodity supply.

An additional question is the degree to which consumers rely on the labeled price per pound for precise value comparisons. They may simply use the total package cost as a rough gauge. If package cost comparisons are common, the impact of drained weight labeling will be reduced, as the total package cost of random weight products should remain unchanged.

Thus, we cannot predict the market reaction to implementing net weight labeling change. What we do know, however, is that it is inappropriate to estimate price or quantity changes using estimated price elasticities of demand. The adjustments that actually do take place will be the result of changes in both supply and demand.

### Impacts on Industry

This section evaluates the effect that each of the major features of the proposal would have on meat and poultry processors and retailers.

#### Change to Drained Weight

Industry would have to increase substantially the amount of overfilling or under-labeling of many meat and poultry products to comply with drained weight labeling. The actual increase in overfill for a specific product would vary from firm to firm depending on its current processing and packaging practices. In fact, one leading national packer of processed meats claims that its current tare weight is large enough so that it would not have to increase the overfill to comply with the proposed regulations.<sup>15/</sup>

Whatever increase in tare is required, this change by itself would neither alter the quantity of drained weight meat and poultry available for sale nor alter the real price per pound of drained weight product. However, some distributional shifts in consumer expenditures due to changes in the labeled price per pound could occur. Consumers could shift to products with relatively lower prices following the change; however, the magnitude of the shift cannot be reliably predicted.

Perhaps the fact that tares now set at time of packing vary greatly and appear related to local net weight enforcement represents the most convincing evidence that industry should be able to adapt to drained weight labeling without substantial cost increase. Shippers of prepackaged poultry use different tares for their product when sent to different States. For those States that currently have drained weight regulation, such as California and Michigan, the product is sufficiently underlabeled to insure a high level of compliance. Some State inspectors even claim that shippers of prepackaged products set different tares on their products on a county-by-county and even a store-by-store basis. For example, Chicago uses a drained weight system whereas the rest of Illinois follows a dry tare procedure.

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<sup>15/</sup> Written entry to the public hearing records in a letter to the USDA Hearing Clerk dated May 31, 1978, from Jerry Hiegel, President of Oscar Mayer and Co., and telephone conversation with Don Paul, Vice President, Quality Assurance, Oscar Mayer.

In tests conducted by ESCS with the 10 State and metropolitan inspection agencies, the apparent tare set by packers seemed higher on products shipped into those localities using wet tare or drained weight than into localities using dry tare. The comparison shown in table 4 is based on deep-chilled prepackaged whole cut-up chicken. The tare was calculated by subtracting the labeled weight from the gross weight and then dividing the difference by the gross weight to give a percentage.

The tare is only apparent because the gross weight used is the retail gross weight, not the gross weight at time of packing when the tare was actually set. However, the gross weight at packing and retail would differ because of shrinkage. North Carolina data indicated that shrinkage, or evaporation of moisture from the package, was nearly zero for deep-chilled products. A percentage comparison of the tare was made because the average weight of packages differed from lot to lot (table 4).

The apparent tare for prepacked chicken shipped to localities using wet tare averaged 5.4 percent of the gross package weight. The apparent tare on packages inspected in the three dry tare States averaged 3.5 percent.<sup>16/</sup> Processor A used a 5.9-percent tare on packages shipped to the Los Angeles area but used a tare of only 3.9-percent for packages shipped to Maryland and North Carolina. Likewise, processor C used a tare of 6.2 percent on packages sent to Chicago, almost double the 3.3-percent tare used for packages shipped to Buffalo, New York.

The broiler industry has claimed it would have to shift to scales that can be set with a percentage tare for prepackaged products to comply with the proposed regulation. Most firms use scales that set a tare in a fixed fraction of a pound. "One company alone estimates that it would cost \$5 million to replace the scales now in its plants."<sup>17/</sup> Scales which can handle percentage tares are obviously preferable as moisture loss allowance would be on a percentage basis. However, the gross weights for chicken packages of a given cut are usually similar enough that a percentage tare can be converted to a fixed fraction tare without losing precision. The most persuasive evidence that the industry could comply using their existing scales is that they currently adjust the set tares depending on destination and when they pack for drained weight States.

Although a substantial percentage of bulk shipments are received short weight according to the retailers and the weights and measures officials surveyed, in practice the proposed regulations would probably have little impact on these products. Over two-thirds of the inspection agencies answering the ESCS questionnaire said they inspected bulk shipments only upon request or not at all, and most agencies do not have the resources to expand inspection of bulk shipments. Furthermore, in most cases, the action taken against violators was to adjust invoices--identical to current industry practices. The proposed regulations would give small buyers additional leverage in adjusting invoices for short weight shipments.

Changing to drained weight would probably increase costs to retailers due to additional reweighing and rewinding of packages routinely opened during inspection and to more frequent monitoring of the meat counter to locate and rewrap packages with excessive drainage.

However, the additional cost to retailers would be fairly small for several reasons. First, a large number of State and local jurisdictions are currently opening packages for at least some meat and poultry products to determine a wiped dry tare or

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<sup>16/</sup> The data for the dry tare States included one set of observations for deep-chilled whole cut-up chicken from North Carolina State data.

<sup>17/</sup> Written entry to the public hearing records dated June 2, 1978, from the National Broiler Council.

a wet tare. Of the 19 retailers contacted by ESCS, 14 said inspectors routinely opened packages to determine the tare weight and 13 said they absorbed the cost of handling the opened packages. In addition, 15 of the 19 retailers have a policy of repacking packages containing excessive moisture. Thus, for many retailers, many rewinding and reweighing costs required of a drained weight procedure are already built into the system. Most retailers reduce the need to rewrap by packing for a shelf life of only 1 or 2 days. However, a large retailer reported that its stores in Chicago, a drained weight jurisdiction, had substantially higher rewinding costs than stores in neighboring dry tare jurisdictions.

#### Averaging Procedures and Allowable Variations

Under the proposal, for lot sample sizes of 10 and 30, no individual sample packages may fall below the maximum allowable variation. The sample average net weight must equal or exceed the average labeled net weight. Adopting the proposed changes in the averaging procedure and the allowable variations would have only a minor effect on the industry and would accord with recommended procedures in the National Bureau of Standards' revised Handbook 67 on checking prepacked commodities.

For most meat and poultry products, by far the greatest moisture loss is due to weepage into the package rather than to shrinkage or moisture loss to evaporation. Thus, eliminating the allowance for moisture loss due to evaporation would require only a small additional overfilling or underlabeling beyond that already required.

The proposed Maximum Allowable Variations (MAV's) are designed to provide specific limits that individual packages can fall below the labeled net weight and still be in compliance. These allowable variations are independent of moisture loss considerations. The smaller the MAV's the greater the overpack required, but the greater the assurance that consumers will receive at least the labeled net weight.

In the ESCS field tests, 25 lots of whole cut-up chicken were inspected in California and Michigan, current drained weight States for these products. Of the 25 lots, 14 were deep-chilled prepack and 11 were in-store packed. The proposed Federal inspection procedure as specified in the Federal Register was applied to each lot. The average drained weight of the packages in the lot must equal or exceed the average labeled weight. No single package could be less than its labeled weight by more than a maximum allowable variation of 0.04 lb. on a drained weight basis. For the in-store packed chicken, 7 lots were in compliance and 4 would have been rejected. For the prepackaged product, 8 lots were in compliance and 6 would have been rejected. In nearly every case, the rejection was based on a single package which was under its labeled weight by more than the maximum allowable variation. Obviously, these compliance rates are too low. However, supermarkets and packers whose products were inspected were not currently trying to comply with the specifics of the proposed Federal regulations.

Weights and measures officials overwhelmingly felt that the proposed regulations, after a short adjustment period, would not make compliance rates decline. Of the 45 weights and measures agencies responding to the State questionnaire, 75 percent felt compliance would increase or would not change, and 5 percent gave no opinion.

If compliance rates do remain approximately the same under the proposed regulations, there should be no cost increase to return failed lots to processors. The amount of failed product returned to packers is quite small. Only 2-4 percent of meat and poultry lots tested are currently short weight, according to State officials. Of those lots of prepackaged meat and poultry that do fail, only a small percentage are returned to the packer (see responses to question 3 of the State questionnaire in appendix A).



Most observers agreed additional weight categories for MAV's were needed, especially at the higher weight levels. USDA officials concur and are considering alternatives to increase the size of the MAV for heavier packages, such as those used in bulk shipments.

#### Mandatory Net Weight Quality Control

The proposed regulations require federally inspected plants shipping products which bear net weight statements for direct sale to consumers to install an approved quality control (QC) system. Considerable uncertainty exists about the requirements, specifications, and costs to industry of an approved net weight QC system. To help clarify these issues and to develop more accurate QC cost estimates, FSQS has provided more detailed specifications and procedures for a prototype QC program.

A major point stressed by FSQS officials is that the full drained weight testing procedure as outlined in the proposal would not have to be followed during routine net weight testing by QC personnel. The proposed drained weight procedure is intended to provide a uniform verifiable standard for compliance testing. In setting up a QC program, a plant would conduct tests to determine an adequate tare weight for each product so that the product would be in compliance when shipped from the plant. Once the tare weights for each product were determined, the QC technician would simply subtract the tare weight from the gross weight during on-line net weight testing. No packages would be opened during routine checks.

Number of plants.--Table 7 shows that in 1978 there were 6,350 meat processing plants. About 95 percent, or 6,032 plants, pack some product in retail-sized containers and would be subject to mandatory QC programs. Over 65 percent of these plants are in the small to very small category. Fifteen plants operate more than one shift. About 148 plants process young chickens in retail-sized packages (table 8). Only eight of these plants have five or more packing lines. One QC technician can handle up to four or five lines. Of the 6,180 meat and poultry plants subject to the proposed QC regulations, about 500 already have QC systems in operation. The remaining 5,680 plants would have to establish approved QC programs.

Specifications.--Each plant must obtain approval for the sampling frequency and sample size used to determine the average tare weight and the net weight inspection. The duties of the QC technician are: (a) to establish daily or weekly the tare weight per product and production line, (b) to check scales daily, (c) to select sample, (d) to weigh and record the average weight and range on chart, and (e) to follow-up on failed lot. The sampling frequency could vary from a minimum of one time per hour per product (or product line) to three times per hour. These are routine tasks that, according to industry sources, could be handled by a QC technician with a high school level education. The annual salary level for this type of employee was estimated at \$13,000 to \$14,000 plus 40 percent to cover fringe benefits, or a total cost to the firm of \$20,000 (\$9.62/hr.).

The estimated time required for net weight control for one production line per shift is listed below:

1. To establish tare weight and check scales
  - a. Daily 10-15 minutes per day
  - b. Weekly 10-15 minutes per day
  - c. Per shipment 10-15 minutes per day
2. To check net weight
  - a. Select, weigh, and record 8-15 minutes per subgroup
  - b. Daily paperwork 5-10 minutes per line or lot
  - c. Follow up on failed lot 5-30 minutes per lot or portion of lot

Table 7--Meat processing plants, by size category, 1978

Size category	:	Plants	:	Share of total output
	:	<u>Number</u>	:	<u>Percent</u>
Very small:	:			
0 - 0.50	:	2,611	41.1	0.6
Small:	:			
0.50 - 2.0	:	1,527	24.1	2.2
Medium:	:			
2.0 - 13.0	:	1,406	22.1	11.1
Large:	:			
13.0 - 100.0	:	644	10.1	31.1
Very large:	:			
100.0 - 1,197	:	162	2.6	55.0
Total	:	6,350	100.0	100.0

1/ Average annual output, million pounds.

Source: U.S. Department of Agriculture, Food Safety and Quality Service.

Table 8--Poultry plants processing young chickens in retail-sized packages, 1979

Packing lines per plant	:	Plants
	:	
	:	<u>Number</u>
5 to 10	:	8
	:	
4	:	26
	:	
3	:	14
	:	
2	:	67
	:	
1	:	22
	:	
Not listed	:	11
	:	
Total	:	148
	:	

Source: U.S. Department of Agriculture, Food Safety and Quality Service.

Based on these time estimates, taking daily tare weight and scale checks, and sampling, weighing, and recording weights three times per hour would require nearly 7 hours per day. This represents the upper limit of the sampling frequency and thus would be the maximum time required for mandated QC activities. Assuming a 5-day workweek and a full 52 weeks per year, the annual time required from QC personnel would be 1,820 hours. At \$9.62 per hour, the yearly cost per plant would be \$17,508, or \$99 million for all 5,680 plants that do not have approved QC programs. In the unlikely event that each plant would hire an additional full-time QC employee at a cost of \$20,000 per year, the upper limit of the annual labor cost for these plants would increase to \$114 million. This estimate probably substantially overstates the additional labor cost required for net weight QC. Many plants would not be required to select samples three times per hour, nor would all plants likely hire an additional full-time employee.

If tare was determined weekly and the sampling rate was only once per hour, the time required would be about 3 hours per day. Under this assumption, an employee would have to spend only halftime on net weight quality control. This would reduce the annual cost to the 5,680 plants to approximately \$57 million (5,680 plants x \$10,000). Nearly half these plants are in the very small category with an average weekly output of only 3,400 pounds. It is highly unlikely that they would hire a full-time QC technician, and it is questionable how many would be financially able to hire a part-time QC technician. Many plants would probably try to utilize existing personnel for quality control, which for this size plant would generally require less than 2 hours per day.

An additional expense would be required if each plant purchased the two sieves and receiving pans specified in the proposed regulation even though they would not be used during routine QC checks. The two sieves and receiving pans would cost about \$263 for each plant. Thus, an additional expense of \$1.6 million would be required if each of the 6,180 plants subject to QC regulations purchased this equipment. Additional QC costs, including cost of sieves, could range from \$59 million to \$116 million.

It is unclear to what extent the increased QC costs would be passed along in higher prices. As most large firms already have QC programs, they would have little or no increased costs to pass on. Thus, if the largest firms did not raise prices because of QC costs, the smaller firms could find it difficult to pass on increased costs without losing sales. In 1978, total annual output from federally inspected meat processing plants was over 24 billion pounds, and federally inspected poultry processing plants sold about 10 billion pounds of broilers, ready-to-cook basis. Assuming the \$116 million additional QC cost would be passed on to consumers, the implied increase in price per pound would be less than one-half of one cent ( $\$116 \text{ million} \div 34 \text{ billion pounds} = 0.3 \text{ cent}$ ).

#### Impacts on Consumers

Consumer reaction to changes in the labeled price per pound of meat and poultry products resulting from drained weight labeling has been discussed. Additional overfilling or underlabeling caused by the proposal would not change the real price per drained weight pound. Many consumers, however, would likely perceive any resulting increase in the labeled price per pound as a real increase in the cost of the product. What adjustments, if any, consumers would make in their expenditures for meat and poultry would depend on their perception and understanding of the real price per pound before and after the rule change. However, consumer expenditures for meat and poultry products would increase to the extent industry costs from the quality control program, estimated at \$59 million to \$116 million, would be passed through.

Another significant implication is that under the current dry tare regulations, the true price per drained weight pound tends to be understated on the label. Under the proposed drained weight regulations, the price per pound typically would be overstated on the label because of the additional overpack needed to compensate for variability in moisture loss. For products with wide variability in moisture loss, it is unlikely that drained weight labeling would clarify information on price per pound for different packages of a particular product.

Table 5 (on page 20) compares the effect on the labeled price per pound of adopting the regulation on drained weight at retail. Dry tare and drained weights were obtained at retail for each of the 14 products listed. The chicken products listed, items 9 through 12, were all prepackaged products of a nationally known processor. The data were collected in May 1978.<sup>18/</sup> For each product, the sample consisted of 30 or more packages, except for sliced bacon, beef salami, and sliced ham with only 20, 10, and 7 observations, respectively.

Column 1 gives the average drainage per retail package for that product as a percentage of the labeled weight. The original weight of the product at time of packing was unknown for all but the chicken products which were weighed when packed at the plant. Therefore, drainage was given as a percentage of labeled weight, and any moisture loss due to evaporation was not included. Beef liver had the highest drainage at 7.23 percent. The mean drainage for this sample of bacon was zero.

Column 2 gives the percentage moisture loss allowance, for drainage only, necessary to insure a 99-percent compliance rate with a drained weight at retail regulation. For example, for pork chops with a sample of 60, the standard deviation of 0.48 percent was multiplied by a t value of 2.39, which yielded 1.12. The moisture loss allowance would have to be 1.12 percent greater than the mean loss of 0.38 percent, or 1.50 percent. A 17.08-percent drainage allowance would have to be made for beef liver because of its high average and high variable moisture loss.

Column 3 gives the average price per pound on the label. This figure multiplied by the labeled net weight of the product gives the cost of the package. Column 4 gives the average drained weight price per pound of the product. This figure was derived by dividing the price of the package by the drained weight of the product for each package sampled. The results were then averaged across all observations for that product. If a package of beef liver suffers the average drainage of 7.23 percent, the consumer, on the average, is actually paying a price per drained weight pound of \$1.11, not the labeled price of \$0.97 per pound. However, the drained weight price per pound for any specific package depends on the drainage for that package, which might vary from zero to over 17 percent for liver.

Column 5 gives the price per pound that would appear on the label under a drained weight at retail regulation. The derivation of this number can be most easily shown with an example. To insure 99-percent compliance, a maximum moisture loss of 17.08 percent will have to be allowed for beef liver. If 1 pound of liver is placed in a package, it will only be labeled as 0.83 pound. The price in column 4, the average drained weight price per pound, already reflects an average drainage of 7.23 percent. The additional allowance will be 9.85 percent more than this average.

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<sup>18/</sup> Data from North Carolina Department of Agriculture. Chicken price data were not recorded, so those prices are for May 1979 in the Washington, D.C., area for the same processor.

The relationship for liver between the price (column 4) and the labeled price per pound under a drained weight scheme, indicated as x, can be expressed as follows:

$$x = \frac{\$1.11/\text{lb.}}{(1.00 \text{ lb.} - .0985 \text{ lb.})}$$

Subtracting the additional allowance of 9.85 percent, or 0.0985 on a per pound basis, yields 0.9015 lb. Dividing 0.9015 lb. into \$1.11, the price in column 4, yields a labeled price per pound of \$1.23. The labeled price will be 11 percent greater than the average drained weight price of \$1.11/lb. In other words, if you lower the labeled weight by 9.85 percent without changing the amount of meat in the package, you raise the labeled price per pound to \$1.23.

When comparing the price per pound in columns 3 and 5, remember the same amount of meat or poultry is in the package.<sup>19/</sup> All that changes is the information on the label. The current labeled price per pound in column 3 understates the average drained weight price per pound in column 4 in eight cases. The degree of understatement increases as the level of average drainage in column 1 increases. Conversely, the labeled price per pound under a drained weight regulation in column 5 overstates the price in column 4 in 12 cases. Column 5 is based on the allowance for maximum moisture loss, whereas column 4 reflects only the average loss. For stew beef (item 5), the current labeled price of \$1.69 understates by 2 cents the average drained weight price per pound. However, the labeled price per pound of \$1.74 under a drained weight system overstates the average drained weight price per pound by 3 cents. For any given package, the true price per drained weight pound will depend on the actual moisture loss for that particular package.

Of the three prices given in table 5, the price per pound data in column 4 would be the most useful information for making value comparisons because, over a large number of purchases, the consumer would likely be receiving the average drained weight. Thus, shifting to a drained weight regulation does not necessarily provide more accurate price information from which consumers can make value comparisons among packages or brands of a particular product.

Table 6 shows increases in the labeled price per pound for several meat products caused by a shift to drained weight labeling. As in table 5, the increase in price per pound for most products ranges from 2 to 6 cents. However, for some products, such as corned beef, the price per pound could increase nearly 20 cents for a 55-ounce package. Increases of this magnitude in the labeled price per pound could have considerable effect on consumers' perceived value of corned beef relative to alternative meat products even though the actual cost per package would not change.

#### Impacts on Federal Government

The proposed changes would have only a minor impact on costs to the Federal Government, but they could cause a rise in the Consumer Price Index (CPI).

#### Additional Workload

The main impact of the proposed regulations on the Federal Government would be the additional workload to approve up to 5,680 QC programs. Federal meat and poultry inspectors could reduce time spent on net weight inspection and increase time spent on food safety inspection. To balance the workload and reduce the burden on individual

<sup>19/</sup>As discussed in the previous section, fixed weight packages, such as bacon, must be handled somewhat differently.

plants, FSQS has indicated they plan to implement the QC programs over a 1-year period or possibly longer. Assuming a temporary redirection of staff during this period, FSQS will not need to hire additional staff for approving QC programs.

The proposed regulations could also affect the workload of FSQS's Enforcement and Evaluation Division which has regulatory control over meat and poultry products after they are shipped from inspected plants. The division's 60 compliance officers inspect businesses throughout the distribution channel: (1) to control adulterated or mislabeled products so that they do not enter consumer food channels, (2) to detect violations and document evidence for administrative or legal action, and (3) to educate industry and consumers to requirements. Although, in theory, the 60 compliance officers could provide additional resources for inspecting net weight compliance at wholesale (bulk shipments), in practice, nearly all their time is spent controlling hazardous or fraudulent products. FSQS has indicated that it does not intend to enlarge the compliance program for additional net weight inspection at this time.

### Consumer Price Index

Even though there would be no increase in real price per drained weight pound, any increase in labeled price per pound would be picked up and incorporated into the CPI for those meat and poultry items that are priced. In theory, a one-time adjustment in the CPI could be used to prevent any price increase resulting from a change in the definition of net weight.

However, the size of the adjustment for any product would be extremely hard to determine. First, for those States and localities that use a drained weight or wet tare, price adjustments are already built into the system and no increases in the labeled price per pound would be expected. For example, prices of chicken packages in areas such as Michigan, California, and Chicago would require no adjustment in the reported price. Second, different companies currently use different tares for the same product and, thus, would have different increases in labeled price per pound. These factors must be considered when developing an average adjustment for each meat and poultry product included in the CPI price survey. Third, considerable variation in timing regarding when firms would actually adjust price per pound in various markets could occur, thereby making it difficult to determine when to make the CPI adjustment.

Even if these measurement difficulties could be overcome, the following example will show that increases in the labeled price per pound for meat and poultry products caused by changes in net weight labeling regulations would likely have a small impact on the overall CPI. Let us assume that the average increase in the labeled price per pound for all red meat products would be 1.0 percent, and for all poultry the average increase would be 3.0 percent (again, the actual price per drained weight pound would not increase). The average increase in the labeled price per pound for meat and poultry weighted by their relative importance in the CPI would be 1.2 percent. As meat and poultry have a weight of 29 percent in the food-at-home component of the CPI, the 1.2-percent increase in the reported price per pound for these items would result in a 0.4-percent increase in the food-at-home component. Meat and poultry have a weight of 3.71 percent in the total CPI. Thus a 1.2-percent reported price per pound increase for meat and poultry would increase the overall CPI by 0.04 percent.

### Impacts on State and Local Governments

The proposed changes would have a larger impact on State and local governments than on the Federal Government. However, considerable variability would clearly exist in the way individual States would implement the proposed regulations, thus making precise cost estimates difficult to assess.

## Change to Drained Weight

The adoption of the proposed drained weight inspection procedures, if followed during routine inspections, could stretch the inspection capabilities of many State and independent metropolitan agencies. A drained weight inspection takes substantially more time per package than a dry tare inspection. In the field tests conducted with the Maryland State Inspection Service in College Park, Maryland, the drained weight inspection of 10 packages of whole cut-up chicken required over 2 hours. The time required would be shortened as the inspector became familiar with the procedure. However, 1-1/2 hours is about the minimum time required for the drained weight inspection of 10 packages including equipment set-up and take-down. Allowing 10 packages to drain 2 minutes each requires 20 minutes, unless additional sieves are used simultaneously. In addition, the screen must be cleaned between each package check. In testing the proposed procedure, several inspectors reported that there was little or no drain into the bottom of the sieve after the 2-minute period. Thus, considerable time would be saved without any apparent loss in accuracy by reducing the required drain time. In contrast, the dry tare inspection of 10 packages would probably only take 10 to 20 minutes. Much of this time would be required for equipment set-up and take-down.

A major objective of the ESCS survey of State and local weights and measures agencies was determining the likely response of these agencies to the proposed drained weight labeling regulations. The number of inspectors in most States is fairly low: 22 States and 4 local jurisdictions reported 14 or fewer inspectors, 11 States had between 15 and 20 inspectors, and 8 States reported more than 50. Budgets for meat and poultry inspection are also modest: 20 States estimated that less than \$100,000 was spent on this activity; 14 States budgeted between \$100,000 and \$999,999; only 1 State reported more than \$1 million. These figures may be under-reported as many local inspectors and budgets were not included.

Although the proposed procedures would be more time consuming, most agencies did not feel their budgets would be increased if the regulations were adopted. Of the 45 agencies responding, 31 reported their State would not appropriate more money for net weight inspection, whereas only 5 felt their budget would increase, and 9 gave no opinion or were unsure.

If weights and measures budgets were not significantly increased, States would have the option of: (1) using the proposed procedure with the same number of inspectors and reduce product and store coverage, (2) using screening methods or short-cuts--and actually use the proposed drained weight procedure only when a violation is suspected, or (3) continuing current inspection procedures.<sup>20/</sup> Assuming the proposed regulations were adopted, 51 percent of the respondents said they would use some kind of two-stage screening procedure--opening only one or two packages per lot to gauge compliance and using the proposed method only to verify a suspected violation. Another 22 percent said they would continue their current inspection procedures. Sixteen agencies (35 percent) said they would use the proposed procedure and reduce the number of lots checked. Thus, most State and local agencies would not incur the expense of opening 10 packages for each lot inspected. However, resources redirected toward opening packages for net weight compliance may be taken from some other function of the office.

Considerable diversity exists among current net weight inspection procedures. Many States open at least some packages during inspection. Fifty-six percent reported they opened one to five packages during routine inspection. Most of the opened

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<sup>20/</sup> Federal net weight regulations would not prevent States from using less stringent inspection procedures than the Federal standards.

packages are rewrapped by the retailer. Twenty-seven percent of the respondents reported that inspectors purchased opened packages. A few States, like Oklahoma, purchase all the packages they open. Most States purchase less than 10 percent of the opened packages. These products are often donated to government institutions so the purchase cost is partially offset by the institutions' reduced food expenditures.

Although only 6 respondents reported using wet tare or drained weight exclusively, 13 (28 percent) use a wet tare at least some of the time. Montana, for example, uses dry tare for meat and wet tare for poultry. Forty-two percent use a wiped dry tare for prepack products. This requires opening one or two or more packages per lot. In addition, five respondents said they regularly puncture packages with excessive drain before inspecting and nine said they do this sometimes. Many inspectors require retailers to rewrap packages with excessive drain before they begin checking. Thus, many States in addition to the wet tare States use methods that at least partially exclude excessive free liquid from the net weight.

The frequency of inspection is already fairly low. Twenty-one reported that they try to inspect retail food stores about every 3-5 months. Twelve reported the averages as 6-11 months, and eight said about once every 12 months. If inspection agencies respond by sampling fewer packages per lot and typically utilize a short-cut procedure, the frequency of inspection per store should not change appreciably. To gather data to use as legal evidence to prosecute a possible violator, inspectors would have to utilize the full inspection procedure as stated in the Federal regulations. Otherwise, the evidence could be legally challenged in court.

An additional expense to State and local weights and measures agencies would be the cost of sieves and receiving pans. Each inspector would need a 12-inch diameter and an 8-inch diameter No. 8 stainless steel sieve and two receiving pans. The W. S. Tyler Company, which manufactures about 80 percent of the sieves used in precision measuring, supplied cost data. Each 12-inch sieve costs \$77; 8-inch sieves cost \$42; and receiving pans cost about \$72. Total cost per inspector would be about \$263. From the State questionnaire, the number of State and local inspectors was estimated to be at least 1,600. This total may under-report the number of local inspectors. Total cost to weights and measures officials for the sieves would be at least \$420,800.

#### Averaging Procedures and Allowable Variations

Most respondents (64 percent) felt that the MAV's and the deletion of the moisture allowance would help inspectors determine whether or not a package is in compliance. Twenty-five percent did not think the proposed regulations would help determine compliance, and 11 percent had no opinion. Removing the moisture allowance would provide a verifiable standard at point of inspection that could be enforced against prepackaged product as easily as against in-store pack. In practice, two-thirds of the respondents said their inspection activities had not been adversely affected by the Rath decisions. These States continue to inspect prepacked product, but because the compliance rate is high and the penalty for failed lots is relatively mild (administrative action in more than 90 percent of the cases), processors have not challenged the legality of these inspections.

#### Quality Control

Mandatory quality control could aid local inspectors in two ways. First, by extending QC programs to all plants shipping consumer packaged products, local inspectors would have greater assurance that all prepack products were in compliance



when shipped and might thereby reduce the frequency of checking these products at retail. Second, Federal inspectors would continuously monitor plant QC records and alert State officials of particular shipments not appearing to have an adequate tare weight to comply at retail outlets.

### Summary of Benefits and Costs

The economic benefits from shifting to a drained weight labeling requirement are substantially less than many consumer groups contend, but the costs of such a shift are also substantially less than the producer groups contend.

#### Benefits

- o Drained weight labeling regulations can guarantee that most consumers receive at least the stated weight in "consumable" product. However, drained weight labeling cannot insure accuracy of the labeled weight or the labeled price per pound in terms of what is actually in a specified package.
- o A drained weight system is less susceptible to abuse than a dry tare inspection. However, little evidence exists that such abuse is now widespread.
- o The proposed regulation would provide incentives for the industry to reduce the amount and variability of moisture loss of products. Reduced variability of moisture loss would increase the accuracy of the drained weight label.
- o Value comparisons between meat and poultry products which differ widely in moisture loss would be improved. However, because the amount of overpack could vary from brand to brand, under both the current as well as the proposed net weight regulations, value comparison among brands of a given food item would not be made easier.
- o Eliminating moisture loss allowances would facilitate on-site enforcement by State and local weights and measures officials. Inspectors would be able to determine compliance by use of scales only and would not have to make arbitrary judgments concerning the size of "reasonable variations" due to moisture loss.
- o The proposal would provide to all wholesale buyers the legal right to receive full net weight on bulk shipments. In practice, buyers would continue to have primary responsibility for checking net weight of bulk shipments as these shipments are not routinely inspected by Federal or local officials.
- o Mandatory quality control would greatly expand frequency of in-plant net weight monitoring and should improve compliance with the stated net weight.

#### Costs

- o Mandatory quality control would increase industry costs by \$59 to \$116 million. The impact on the smaller firms would be greater than on the largest firms, many of which already have quality control systems.
- o Products with the highest moisture loss would likely have larger increases in their labeled price per pound relative to products with a lower moisture loss. Consumer expenditures could shift to products with relatively lower prices following the change in regulation. The full effect of these relative price shifts on expenditures, however, would depend on consumers' perceptions and knowledge about net weight labeling, as there would be no change in the real price per drained weight pound.

o Retailers not located in jurisdictions currently using some form of drained weight inspection would likely have modest additional costs from more frequent rewrapping of in-store packaged product. Retailers would also absorb the cost of opened prepack packages not purchased by inspectors or returned to the processor. The number of processor-packed packages opened during routine inspection would be minimized by screening techniques, according to chiefs of State inspection agencies.

o The cost of sieve and receiving pans to weights and measures officials is estimated at \$421,000. Many agencies would have additional costs from purchasing prepackaged packages opened during inspection. Two-stage screening techniques would be incorporated by most States, which would reduce the number of opened packages. For example, Michigan uses a drained weight system and opens only one package per item tested, unless there is evidence of short weight. These costs would generally have to be absorbed into current budgets as most officials do not anticipate additional funding.

o Drained weight labeling regulations would encourage the industry to make adjustments in packaging and processing procedures. However, these adjustments are continual and are influenced by many factors besides net weight labeling considerations. For example, the cost of shifting to hermetically sealed packages could not be attributed solely to drained weight or wet tare regulations. Many other quality factors are involved. For many processed meat products, hermetically sealed packaging is just as prevalent in dry tare States as in wet tare States.

## APPENDIX A: Questionnaires

Of the 66 questionnaires sent to State and local weights and measures officials, 45 were returned completed. Among those 45 were 3 cities (Baltimore, Washington, D.C., and Philadelphia), Puerto Rico, and 41 States. This represents a return rate of 68 percent overall and 82 percent for the States.

The following questionnaire shows the number of respondents that replied to a specific question and, to the left of that number, the percentage of 45 total replies.

In some cases, replies to a specific question total more than 100 percent because multiple answers were allowed. State inspection practices are subject to the discretion of the inspector, and thus more than one action may be taken by the same office under different circumstances.

STATE QUESTIONNAIRE

ESCS/USDA STATE QUESTIONNAIRE ON PROPOSED NET WEIGHT LABELING REGULATIONS

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

JURISDICTION: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

CHECK APPROPRIATE ANSWER

1. Current retail net weight inspection procedures for meat and poultry.

a. How many packages of each product generally are chosen for the sample?

2% 1                      9% 4 5

7% 3 2                      82% 37 10                      and                                 More than 10

b. How is tare determined? If more than one method is used, please indicate for what product groups.

Product groups

\_\_\_\_\_ 11% 5 Dry tare--printed on package

\_\_\_\_\_ 73% 33 Dry tare--sample package provided by packer

\_\_\_\_\_ 42% 19 Dry tare--average of 2 or more opened packages

\_\_\_\_\_ 2% 1 Wet tare--catalogued tare by the inspector

\_\_\_\_\_ 24% 11 Wet tare--average of 2 or more opened packages

\_\_\_\_\_ 2% 1 Drained weight tare--as outlined in the proposal

c. Are packages with free liquid punctured and drained before weighing them during inspection?

red meats

9% 4 Yes                      73% 33 No

18% 8 Sometimes, describe when necessary

poultry

11% 5 Yes                      69% 31 No

20% 9 Sometimes, describe when necessary

d. In a typical inspection, how many retail packages per sample are actually opened?

38% 17 0 (Skip to Question f)

2% 1 6 to 10

56% 25 1 to 5

5% 2 More than 10

2% 1 No answer

\*e. What happens to the retail packages that are routinely opened during inspection? Estimate the percent.

       % Repacked, reweighed, and relabeled by retailer

       % Purchased by the inspector

       % Destroyed or donated

       % Other   

\*f. What action is taken by the inspector against those packages found in violation of net weight labeling? Estimate the percent.

       % Warning--administrative action only; store can reweigh, return product to packer, reduce price, etc.

       % Fine--but no prosecution or court action

       % Legal action--prosecution may result in fines or other penalties

g. In general, how often is each retail food store inspected?

18%   8   Once every 12 months or less often

27%  12  Once every 6 to 11 months

47%  21  Once every 3 to 5 months

7%   3  Once every 1 or 2 months

5%   2  Other   

\*h. How many inspectors check for meat and poultry net weight compliance in your State? #           

\*i. During the last fiscal year, what was the total budget of Office of Weights and Measures in your State? \$           

\*j. What percent of this budget was spent on inspecting meat and poultry for net weight compliance? Estimate the percent even if you can provide only a rough approximation.           

\* Summary of replies to this question appears at the end of the questionnaire.

2. Prior to the Rath decision, did your State inspect in retail stores meat and poultry products that are pre-packaged in federally inspected plants?

Pre-packaged meat

64% 29 Yes, frequently  
31% 14 Yes, occasionally  
5% 2 No

Pre-packaged poultry

64% 29 Yes, frequently  
31% 14 Yes, occasionally  
5% 2 No

IF ANY YES TO QUESTION 2, ANSWER QUESTION 3

- \*3. Of the pre-packaged meat and poultry products found in violation of net weight labeling, estimate the percent that are returned to the packer.

Pre-packaged meat

         % Of failed lots  
returned to packer

Pre-packaged poultry

         % Of failed lots  
returned to packer

4. What effect has the Rath decision had on your ability to enforce State net weight regulations, particularly pre-packaged meat and poultry shipped inter-state?

27% 12 No effect

38% 17 Little effect

20% 9 Great effect

16% 7 Not checking  
federally in-  
spected pre-  
packaged meat  
& poultry any  
longer

5. If the proposed net weight regulations were adopted, to what extent, if at all, would your State inspect pre-packaged meat and poultry products shipped from federally inspected plants?

Pre-packaged meat

36% 16 Inspect as frequently  
as in-store pack

60% 27 Inspect occasionally

5% 2 Rarely or never inspect

Pre-packaged poultry

36% 16 Inspect as  
frequently as  
in-store pack

58% 26 Inspect occa-  
sionally

5% 2 Rarely or never  
inspect

6. Do you feel that the new definition of Maximum Allowable Variations and deletion of the Moisture Allowance will help inspectors more easily determine noncompliance of net weight labeling?

64% 29 Yes

25% 11 No

11% 5 No opinion

\*Summary of replies to this question appears at the end of the questionnaire.

- 43

11. The evidence indicates that inspection using a drained weight tare may be more time consuming and costly. Would you:

35% 16 Use the proposed procedure with same number of inspectors checking fewer lots

2% 1 Use the proposed procedure and increase the number of inspectors checking the same number of lots

51% 23 Try to use short cuts--such as increase screening of lots (open only 1 or 2 packages per lot to gauge compliance), use a printed tare, use a dry tare to screen, or use a wet tare catalogued by the inspector; and then use the proposed drained weight procedure only when a violation is suspected

22% 10 No change, continue your current procedures

Other \_\_\_\_\_

2% 1 Try to get more money

12. In your opinion, would your State appropriate more money for Weights and Measures if it is needed to carry out the new regulations?

11% 5 Yes                      69% 31 No                      18% 8 No opinion

2% 1 Maybe

NOTE: If additional time will be required to answer this question, please return under separate cover.

13. Consider the net weight labeling proposal as a whole and then each of its five parts separately. What is the official position of your State?

	<u>No answer</u>	<u>In favor</u>	<u>Not in favor</u>	<u>No opinion</u>
Total proposal	51%	29%	13%	7%
a. Drained weight tare	18%	29%	51%	2%
b. No allowance for moisture gain or loss	19%	56%	16%	9%
c. New maximum allowable variations	21%	53%	22%	4%
d. New averaging procedure	17%	56%	18%	9%
e. Mandatory industry-run quality control system	16%	42%	31%	11%



- 1.e. What happens to the retail packages that are routinely opened during inspection? Estimate the percent.

26 to 45 (58%) responded that retail packages routinely opened are repacked, reweighed and relabeled by the retailer. Of these 26, 22 (85%) said this took place 90% or more of the time.

12 of 45 (27%) mentioned that product was purchased by the inspector. 83% of these said that happened 10% or less of the time.

7 of 45 (16%) mentioned that some product is destroyed after opening.

16 of 45 (36%) gave no answer since they had previously said that no product is opened.

- 1.f. What action is taken by the inspector against those packages found in violation of net weight labeling? Estimate the percent.

All of the 45 respondents (100%) mentioned giving warnings for violations of net weight labeling. 34 of 45 (76%) said that they did so 90% or more of the time.

5 of the 45 (11%) responded to giving fines and all of these said it was less than 10% of the time.

28 of the 45 (62%) replied they did take legal action against violators. 25 of the 28 said it happened in less than 10% of the violations. The 3 respondents who said they took legal action more often when all users of the Wet Tare inspection method. (New Jersey and Philadelphia said they take legal action 80% of the time, and California replied 25% of the time.)

- 1.h. How many inspectors check for meat and poultry net weight compliance in your State?

Breakdown of number of inspectors per State or city.

<u>1-14</u>	<u>15-20</u>	<u>More than 50</u>
22 States and Baltimore Washington, D.C. Philadelphia Puerto Rico	11 States	8 States

The number of inspectors may be under-reported since local inspectors were not included in some cases.

- 1.i. During the last fiscal year, what was the total budget of Office of Weights and Measures in your State?

and

- 1.j. What percent of this budget was spent on inspecting meat and poultry for net weight compliance? Estimate the percent even if you can provide only a rough approximation.

Breakdown of amount of budget for the inspection of meats and poultry for net weight.

0-\$100,000

\$100,000-\$999,999

more than  
\$1 million

20 States and  
Washington, D.C.  
Philadelphia  
Puerto Rico

14 States

1 State

7 responded that these data were not available. 40% of the States are under \$100,000 for 1979. These amounts may be understated as money from local jurisdictions was not included in some cases.

3. Of the pre-packaged meat and poultry products found in violation of net weight labeling, estimate the percent that are returned to the packer.

Pre-packaged meat-32 of 45 (71%) replied that they do return product. 75% of these said that it was less than 25% of the violations.

Pre-packaged poultry-30 of 45 (67%) mentioned returning poultry found in violation. 80% of the 30 said it was in less than 25% of the violations.

10. What action is taken against violators of net weight labeling with respect to bulk shipments of poultry? Estimate the percent.

Of the 45 replies, 36 (80%) said that they required processors to adjust invoices for short weight shipments. Of these 36, 32 (89%) adjusted invoices in more than 75% of the cases.

11 of the 45 (24%) said they used fines or court action for these violations. 10 of these 11 replied this was necessary in less than 20% of the cases.

3 of the replies said they used warnings.  
2 said they took no action.  
1 said they stopped sale.  
3 gave no answer.

## APPENDIX B: Definitions

Tare is defined as the unusable materials containing and contained in a specific product package. However, different definitions of tare depend on what the official inspection agency considers as usable product. Further definitions of tare are offered to explain current inspection procedures of States (and some large cities, when different from their States).

Dry tare is defined in the National Bureau of Standards' draft Handbook 67 as the unused packaging materials.

This tare is composed of all the package material (glue, labels, ties, solder, etc.) which will contain the product, but before the product is introduced into the container. Tare also includes garnishes and decorative additions to the package which are not specifically mentioned on the label (section S.6.1.1).

The net weight of the product includes any free or absorbed liquids in the package.

If an agency defines tare for inspection procedures as the dry tare, there are alternative ways in which the weight of the tare can be determined. First, packers print the value of the dry tare on the packing material itself. Second, many packers send a sample of an unused tare along with the shipment of their product. Third, an inspector may calculate the weight of the dry tare by opening a sample of the packages to be inspected and by cleaning the package material so that it approaches the weight of the unused material. This is sometimes referred to as a "wiped dry tare." Handbook 67 also allows the inspector, before proceeding with a dry tare inspection, to puncture the package with a pin to drain out free liquid if the inspector feels it is excessive.

Wet tare. Handbook 67 defines the wet tare as being "composed of all packing materials which can be separated from the labeled commodity which has been packed with or inside such materials." (S.6.1.2.) Net weight, using wet tare, includes the product and the free liquid that drains off when it is removed from the packages. Any liquid absorbed into the packaging material is considered part of the tare. As with the dry tare method of testing, this tare weight can be estimated by averaging a sample of two or more opened packages (depending on the sample size).

As an alternative to this procedure, a catalog of average values for wet tares for each product tested can be maintained over time. The inspector can refer to this catalog for an average value during the inspection.

Finally, tare can be determined by a drained weight method. This is the method described in the proposed regulations where each package in the sample is opened and the product is drained on a sieve for 2 minutes (or some specified time period). The weight of this drained product is its net weight. All free and absorbed liquid is considered part of the tare. Because of the variability of drainage, the tare weight will likely be different for each package in the sample. Drained weight is the strictest definition of net weight, where only the usable product in each package is considered the net weight. The tare value for a sample may also be estimated from two or more packages to save inspecting time and/or a catalog may be maintained as with a wet tare.

Industry's definition of the tare differs slightly in usage from these definitions. When packing a product for sale in bulk or retail-sized packages, tare weight is simply the difference between the gross weight of the packaged product and the labeled net weight. This tare weight may be subtracted as a set weight from all packages in the lot or, if the equipment is available, the tare may be subtracted as

a fixed percentage of the gross weight of each individual package in the lot. The tare subtracted tends to be larger than the actual weight of the packaging materials to allow for error and for moisture loss during distribution of the product. As net weight is defined differently in various locations, the packer must set the tare value so that the packages will meet the net weight labeling requirements of the locations to which he is distributing. This may mean using a larger tare value if the liquid that drains from the product is not included as part of the net weight by a specific local weights and measures agency.

## APPENDIX C: Instructions

Appendix C is a copy of all information and instructions sent to the 10 State and local Weights and Measures Offices that cooperated with ESCS and collected data at the retail level.

U. S. DEPARTMENT OF AGRICULTURE  
ECONOMICS, STATISTICS, and COOPERATIVES SERVICE  
Washington, D.C. 20250

October 26, 1979

Your cooperation in the net weight labeling of meats and poultry study is greatly appreciated. The data collection that you will be doing is an integral part of our total assessment. Briefly, it is necessary to evaluate the value comparison problem to the consumer within and between specific cuts of meat and poultry. This problem results from the shopper's inability to determine the amount of drained liquid in a particular package at the retail level. A large variability in this drained liquid may affect value comparisons among different cuts of meat and poultry, among packages of a particular cut of product in a retail establishment, or among different processors of a similar product. Also, we hope to get a clearer picture of the increase that would be required in the tare to allow for this loss of liquid from the packaged product.

Therefore, information that more closely defines the extent of this variability is essential to our analysis. We are asking you to collect data on the actual amount of drained liquid and its proportion to the stated net weight on a package of a specific cut of chicken. This study requires that a sample of 10 packages of specific cut of a particular brand of chicken be selected as in normal inspection procedures. Net weight is then determined using both the dry tare method, as described in Handbook 67, and the drained weight method, as described in the proposed regulations. The weight of the drained liquid is calculated by subtracting the drained net weight from the dry net weight. The weight of the drained liquid is then expressed as a percent of the labeled net weight to enable us to make comparisons among all the data collected.

Enclosed are more detailed instructions as to procedures, data collection forms to be completed, and a copy of the proposed regulations from the Federal Register of December 2, 1977. We appreciate the constraints of staff and time under which your office must work. We hope that you will be able to return the completed data collection forms as soon as possible, but certainly by April 20, so that we will have sufficient time to make our analysis.

Thank you for your cooperation in the study. If you have questions or require any further information, please feel free to call me or Linda Weingarten at (202) 447-4191.

Sincerely,

CHARLES HANDY  
Food Economics Program Area  
National Economic Analysis Division

Enclosures

Instructions for Determining Net Weight by  
Wet Tare Method

Use sieve and 2 receiving pans (A & B)

1. Select sample lot
2. Record labeled weight of package (column 1)
3. Determine gross weight of package (column 2)
4. Determine dry weight of sieve and receiving pan A (column 6)
5. Remove strainer and place into receiving pan B
6. Remove the commodity from its package
7. Once all packaging materials are removed, place commodity into strainer and receiving pan B
8. Allow commodity to drain for 2 minutes
9. Once draining process is complete, remove strainer with commodity, and place back into its original receiving pan A
10. Determine weight of sieve and pan A with commodity (column 5)
11. Determine net weight of content  
Formula: (sieve and pan A + product) - (dry and sieve, and Pan A) = net weight  
(column 7)
12. Determine free and absorbed liquid  
Formula: column (4) - (7)
13. Wipe and dry sieve and receiving pan A after each package in sample
14. Repeat the above procedure for the remainder of the packages in the lot, excluding steps 1 and 5.

Instructions for Determining Net Weight by  
Dry Tare Method

1. Dry Tare for this test will be defined as the unused dry tare. It is composed of all packaging materials (including glue, labels, ties, etc.) which will contain the product but before the product is introduced into the container. Giblet bags or wrappers are defined as part of the tare also and should be weighed unused.
2. If possible, prepare a sample dry tare exactly like the one used for the product you are testing. For a prepackaged product, use a processor's sample tare if that is available. If no dry tare is available, do not guess at the weight of the dry tare. Leave column 3 in the table blank, and we will contact the processor to get an exact weight and do the calculations for column 4. If the dry tare weight is available, that weight should be entered as a constant in column 3.
3. The net weight of the product using this method will be the gross weight of the unopened package minus the unused dry tare.

USDA DATA COLLECTION FORM FOR DRAIN WEIGHT STUDY\*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pkg. #	Label weight	Gross weight	Dry tare	Net wt. = (2) - (3) (dry method)	Drained product plus sieve	Dry sieve	Net wt. = drained wt. (5)-(6)	Free and absorbed liquid (4)-(7)	Drain as % of label wt. (8)÷(1)x100
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Inspector \_\_\_\_\_ Tel. No. \_\_\_\_\_ Time \_\_\_\_\_

Store \_\_\_\_\_ Location \_\_\_\_\_ Date \_\_\_\_\_

Packer \_\_\_\_\_ Address \_\_\_\_\_ USDA Insp.# \_\_\_\_\_

\$/lb. \_\_\_\_\_ Code date or age of product \_\_\_\_\_

Container description \_\_\_\_\_

Processing type if known: \_\_\_\_\_ icepack; \_\_\_\_\_ chill-pack; \_\_\_\_\_ "hot" pack; \_\_\_\_\_ CO<sub>2</sub> or dri-pak;

\_\_\_\_\_ Other

\*Use scale with 0.001 pound units,  
if at all possible.



#### APPENDIX D: Retailer Discussion Guide

1. Are you familiar with the U.S. Department of Agriculture's proposed net weight labeling regulations governing meat and poultry products?  
☐ Yes  
☐ No
2. Are you in favor of the proposed net weight labeling regulations?  
☐ In favor  
☐ Not in favor  
☐ No opinion
3. What percent of chicken is prepacked vs. in-store packed at your retail establishment?  
☐ % Prepacked  
☐ % In-store pack  
☐ Varies  
☐ Both kinds, percent not known
4. As a general store practice, do you repack meat or poultry packages because of excessive water in the package?  
☐ Yes  
☐ No  
If yes, how frequently?  
☐ Frequently, or whenever required  
☐ Occasional package  
☐ Other \_\_\_\_\_
5. Do State and local inspectors routinely open meat and poultry packages during inspection?  
☐ Yes  
☐ No  
If yes, who pays for the opened packages?  
☐ Inspector (State or local)  
☐ Store (cost of doing business)  
☐ Processor (if prepacked)

6. If meat or poultry product fails net weight inspection, what do you do with it? Estimate the percent that is:

\_\_\_\_\_ % Reweighed and relabeled  
\_\_\_\_\_ % Repacked, reweighed, and relabeled  
\_\_\_\_\_ % Returned to packer  
\_\_\_\_\_ % Destroyed, donated, or used in other channels

7. If poultry is packed in-store:

- a. Do any bulk shipments of poultry arrive at your store(s) short weight?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

- b. If yes, what percent of bulk shipments are short weight?

\_\_\_\_\_ 80% to 100%

\_\_\_\_\_ 60% to 79%

\_\_\_\_\_ 40% to 59%

\_\_\_\_\_ Less than 40%

\_\_\_\_\_ Don't know

- c. What is the average percentage amount of the product below the invoice net weight?

\_\_\_\_\_ 15% or more

\_\_\_\_\_ 10% to 15%

\_\_\_\_\_ 5% to 9%

\_\_\_\_\_ 3% - 4%

\_\_\_\_\_ 1% - 2%

\_\_\_\_\_ Less than 1%

- d. How do you handle short weight bulk shipments?

\_\_\_\_\_ Call in local inspector to check and possibly file a complaint

\_\_\_\_\_ Adjust invoice, bill packer

\_\_\_\_\_ Make up shortage on next order (additional quantity or lower price per pound)

\_\_\_\_\_ Find another supplier

\_\_\_\_\_ Do nothing

\_\_\_\_\_ Other \_\_\_\_\_

e. If you adjust invoice above, what is the cost of re-invoicing?

\$ \_\_\_\_\_ approximately

Name \_\_\_\_\_ Position \_\_\_\_\_

Retail Store Name \_\_\_\_\_

Address \_\_\_\_\_ Tel No. \_\_\_\_\_

No. of Stores (if chain) \_\_\_\_\_

Size of Store \_\_\_\_\_